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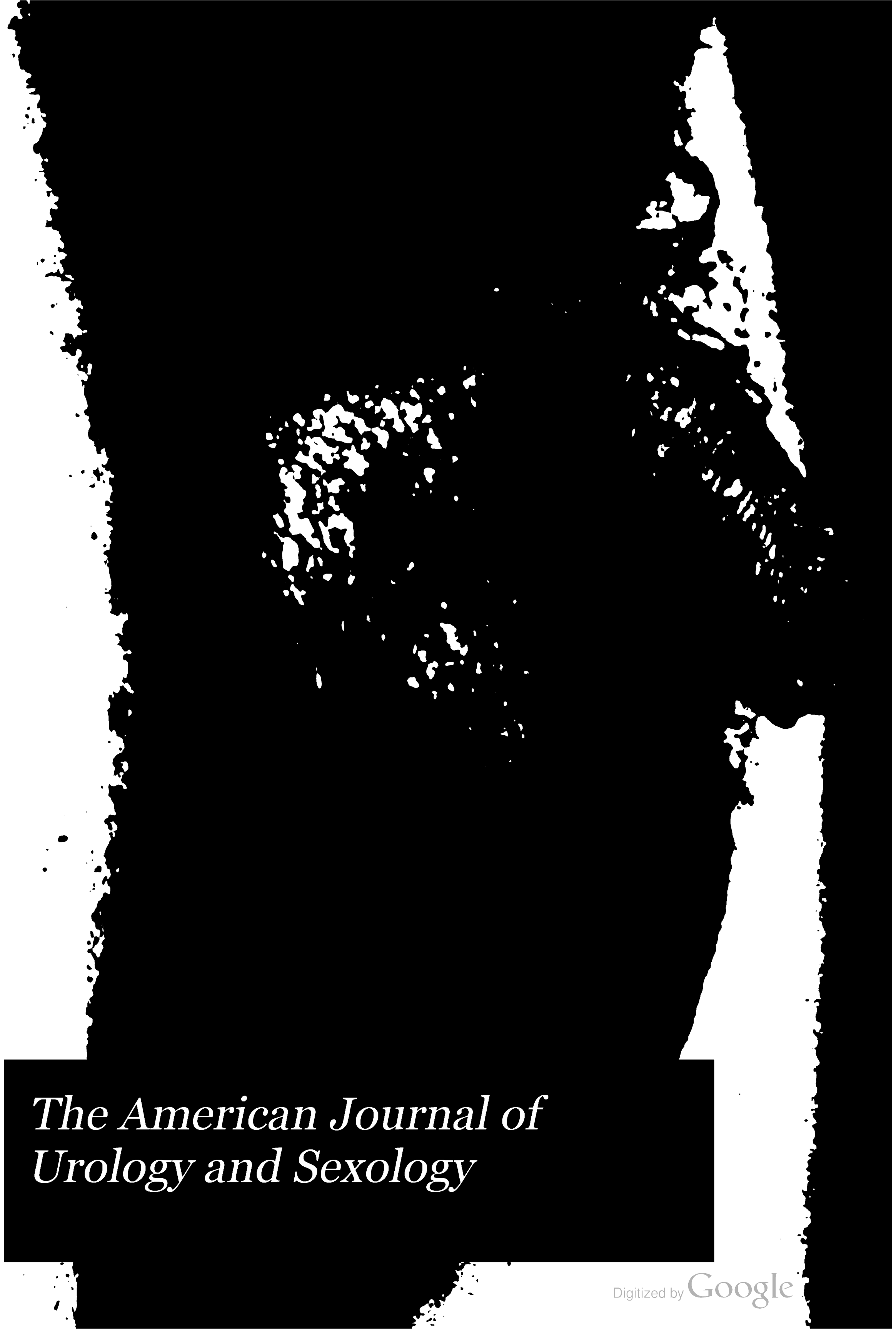

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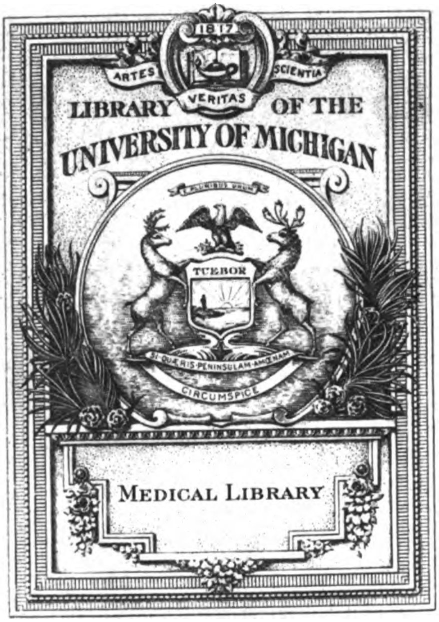

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RENAL AND URETERAL HEMATURIA.[1]

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HEMATURIA, or the appearance in the urine of a sufficient number of red blood corpuscles to change its color, may be of renal origin in a considerable number of conditions. Though one often speaks of a " hematuria " much as if this constituted a disease in itself, it should be remembered that it is only a symptom.

Some of the renal hematurias are the local manifestation of a general disease or condition, as is the case in the hematuria of malaria, scurvy and hemophilia; they have sometimes been termed secondary hematurias; more are the sign of a local diseased condition as is the case in the hematuria of nephritis, calculus, cancer and tuberculosis, when they are termed primary. I shall consider only such of the primary hematurias as indicate local diseased conditions that are amenable to surgical treatment.

In any case presenting the symptom " hematuria," we have two problems that must be settled before we can apply intelligent treatment. The first is the determination of the source of the bleeding, the second the determination of the nature of the lesion that produces the bleeding.

While renal and ureteral hematurias differ from those of urethral origin, in that they are always " total," that is, the blood is intimately mixed through all the urine, there is nothing in their appearance that can be relied upon to distinguish them from hematurias of bladder origin. Before the advent of cystoscopy, many rules were formulated to differentiate the renal hematurias from those arising in other parts of the urinary tract. The more careful study that this subject has received since the introduction of cystoscopy has taught us that practically none of these rules can be depended upon—that all are subject to frequent exceptions.

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[1] Read before the N. E. Urological Society, Hartford, Conn., October 22, 1906.

Thus one of the things that was commonly held to be a distinguishing point between a renal and bladder hematuria was the color of the bloody urine. It was considered that the hemorrhage was from the kidney when it was dark, and from the bladder when it was bright. It is true that renal bleeding is more likely to be dark than bright, but there are so many exceptions to this that one is never safe in concluding from the color alone that a given hematuria is, or is not. of renal origin. Cases of bright bleeding are not infrequently found to be of renal or ureteral origin as happened in one of the cases I shall refer to later.

Another point that was supposed to distinguish a renal hematuria from one of bladder origin, was the condition of the blood corpuscles. It was assumed that the so-called " abnormal blood " was renal in origin. This does not apply at all in cases where the amount of kidney bleeding is very considerable, and only to a limited degree when it is small.

There are two things, however, that if present, have considerable value in determining the probable site of the bleeding. When the urine contains any considerable number of cylindrical clots, one may assume with a fair degree of certainty that the bleeding is from above the bladder, though occasionally one sees clots from a bladder hemorrhage that are longish and have some resemblance to ureteral casts. The presence of renal casts in a bloody urine is highly suggestive that the bleeding is from a kidney—the probability is much strengthened if there are numerous casts with blood corpuscles adherent. While the presence of either of these signs has considerable positive value, their absence is not in the least against a hematuria being of renal origin.

Not only must one be very cautious how he draws conclusions as to the origin of a hematuria from its gross or its microscopic appearance, but he must also bear in mind that subjective and objective symptoms may lead him astray. Perhaps I cannot give a better illustration of this last fact than to quote a case that has been reported by Mr. Swan of London.

A woman, thirty, began to have pain in the left costo-vertebral angle, two years before she was seen by Mr. Swan. Six months after the beginning of her pain, hematuria appeared and she had recurring attacks for a year. Six months before operation, the hematuria became constant and the pain in her left loin more severe. Her left kidney could be palpated, and it was tender, though not apparently enlarged. The natural inference was that the bleeding came from her left kidney. Cystoscopy, however, showed a pedunculated papilloma that was attached just to the outside of the left ureteric orifice. The growth was removed with relief of her symptoms. The hematuria was from the growth, the pain and tenderness in her left kidney were due to a partial occlusion of the ureteric orifice by the dragging of the growth.

Such cases emphasize the fact that cystoscopy is the only accurate means that we have of distinguishing between a vesical hematuria and one of renal origin. The use of any of the various segregators would in a case like that just cited, have led to faulty conclusions.

Cystoscopy allows us not only to determine whether the bleeding arises from the bladder, or further up the tract, but also in the latter instance to determine from which side it is; or, if it is from both, as occasionally happens, to recognize this fact. Fortunately in conditions that are confined to the upper urinary tract, cystoscopy is relatively easy since we do not have to contend with an intolerant or light-absorbing bladder. When the hematuria is considerable, the colored urine will be seen issuing from the ureteral orifice in little puffs, that look not unlike little puffs of smoke as the bloody urine is pumped from the ureter into the clear bladder medium. When the blood is small in amount, it may be impossible to determine by inspection alone which side is bleeding, and one may have to add to simple cystoscopic examination, catheterization of the ureters.

The assumption that blood seen issuing from a ureteric orifice has its origin in the kidney of the same side, is in the main justified, but it does not hold absolutely; the bleeding may exceptionally arise in the ureter itself. The following case is one that I think of considerable interest in this connection, and I shall therefore report it in some detail. The patient, a man fifty-two, was sent to me for examination in April, 1906, by Dr. E. H. Stevens of Cambridge. He had had no previous urinary disease—neither his family nor personal history threw any light on his trouble. One year before his urine had been bloody for a week; with this hematuria he had a little uneasiness in the small of his back. Three months before he was seen he began again to pass bloody urine. Treatment had no effect. When seen he had the semi-cachectic pallor seen in long-continued hemorrhages. Neither kidney was tender nor palpable. His urine was usually dark, but on several occasions it was bright red. He had passed no clots. His urine allowed to settle in a cylindrical glass for 24 hours, gave a compact deposit of blood that was 5 per cent. the height of the column of urine. Repeated examinations showed a urine containing normal and abnormal blood cells with an occasional leucocyte. There were no casts and practically no epithelial cells. Two cystoscopic examinations showed a normal bladder with bloody urine coming from the left ureter. There was no localizing symptom other than a dull backache. I suspected cancer, or a focus of chronic nephritis in his left kidney and advised operation. He was unwilling to submit to operation until May 31, at which time he was so weak that he could not continue at work. The kidney which was high up was not enlarged as a whole, but had on its anterior surface a small nodule, that seemed to extend deeply into the kidney tissue, and which both Dr. Stevens and I thought to be a cancerous mass. The kidney was therefore removed. No blood was found in the pelvis and the mass on the anterior surface extended but a short distance into the kidney substance. Microscopical examination by Dr. Leary showed that this nodule was a bit of misplaced adrenal tissue that was not proliferating, and that the kidney itself was in every other respect normal. The man bled for the first few days following operation much as he had before it. The bleeding then grew less and ceased on the 16th day. He remains well and there has been no recurrence of his bleeding. I believe this an instance of bleeding of ureteral origin that ceased only with the atrophy of the ureter that followed its disuse. Had I catheterized his ureter, collecting specimens from different levels along its course, it is probable that I should have gotten bloody urine from the lower part of the ureter and clean urine from the kidney pelvis. This catheterization of the ureter by sections is probably the only way of distinguishing the rare cases of hematuria of ureteral origin from those of renal origin. The recognition of similar cases is perhaps of more theoretical interest than practical importance since it is questionable whether anything less than nephrectomy would stop the hemorrhage, though temporarily putting the ureter at rest by means of a nephrotomy might suffice and would be worth trying. So much for the localization of the source of the bleeding in hematurias arising in the upper urinary tract.

Having localized a hematuria as being of renal origin and recognizing that it is only a symptom of some local diseased condition it is necessary to determine if possible its underlying cause. For this purpose it is insufficient in most instances to confine one's attention to the hematuria alone; one must consider all the other symptoms that the disease presents and all evidence that can be brought out by different methods of examination. In a large proportion of renal hematurias it will be found that the bleeding depends upon one of four conditions; malignant disease, calculus, tuberculosis or chronic nephritis. The relative frequency of these makes their recognition particularly important and I shall consider them before taking up any of the less well known causes of renal hematuria.

Malignant disease usually occurs in persons over forty, and a very large proportion bleed at some time during the course of the disease. The hematuria is often sudden and profuse, exercise may increase it, but rest on the other hand has little effect in diminishing it. The urine itself shows little other than blood: occasionally when the growth is of the renal pelvis masses of cancer cells may be found, but this is unusual. As a rule the kidney will not be enlarged or nodular in the early stages, the time when it is especially important from the therapeutic standpoint to recognize the disease. Naturally malignant disease of the pelvis will show bleeding much sooner than growths that begin deeper in the substance of the organ. As a result, in malignant disease of the pelvis, it will be unusual to find an enlarged kidney at the beginning of the hematuria, while in cancer that originates in the kidney tissue, the organ may be enlarged when the bleeding first appears. The hematuria is at first usually painless, later there may be colicky pain due to clots passing the ureter. There is no involvement of the ureteric orifice, so often seen in renal tuberculosis. Cachexia is not a very early sign and may be closely simulated by any long-continued renal bleeding. I have seen a moderate evening temperature in a patient with cancer of the kidney. The points upon which one must depend principally for early diagnosis are: a painless hematuria, usually rather profuse, that is uninfluenced by rest, coming on without cause in a person of forty or more; a urine that shows little beside blood; a non-sensitive kidney that may or may not be enlarged. A nodular, firmly adherent kidney belongs to the stage when the disease is practically inoperable. Sarcoma, the malignant disease of the kidney that is seen more particularly in children, though not restricted to them, bleeds less often than carcinoma. It grows rapidly and the size of the kidney mass will usually leave little doubt as to the diagnosis.

Renal calculus may be seen at a much earlier stage than cancer, many of the patients being young adults. There is often the history of the previous passage of renal stones or gravel. The hematuria may, or may not, be attended with pain. In the aseptic cases it may be quite painless and in these same cases there may be no enlargement of the kidney and little or no tenderness on pressure. In the infected cases there will usually be pain, increase in size of the kidney and tenderness on pressure. When pain is present it is of course not the colicky type seen during the passage of a small stone along the ureter. Profuse hematuria is less common than in cases of malignant disease. The increase of bleeding brought on by exercise or jolting is a long-recognized sign that is of considerable value, especially when absolute rest in bed will bring about the practical disappearance of macroscopic blood. The most accurate means of diagnosis is by radiography, which will give a shadow in a large proportion of cases, but may not in the case of pure uric acid stones. Besides the blood one always finds in the urine a considerable amount of mucus and usually an excess of leucocytes and epithelial cells; crystals may or may not be present —one often sees a few hyaline casts. In the infected cases there will be evidence of an inflammatory process of the kidney pelvis.

In the case of a young man who has recently been under my care, and in whom the X-ray shows a shadow in the left kidney, though the presence of a calculus has not yet been verified by operation, there has been practically no symptom other than hematuria. This has existed now for nearly six months. There has been no pain at any time, the kidney has not been enlarged or tender, and until he was cystoscoped there was nothing to point to which kidney was bleeding. The bleeding has always been increased by exercise, while on one occasion macroscopic evidence of bleeding wholly disappeared after a period of rest in bed. The urine is sterile and the inoculation test has failed to show tubercle bacilli. In non-infected primary renal calculi, the absolute lack of all symptoms other than a slight hematuria, may render it difficult to convince the patient of the importance of radical treatment at the time when it is most easily and safely carried out.

Renal tuberculosis is most commonly seen in early adult life, though it is by no means restricted to this period. The hematuria in these cases is usually small in amount and intermittent in character, though it may be occasionally profuse and continuous. Thus Trautenroth removed a tuberculous kidney, that was threatening life from hemorrhage, on the sixteenth day after the appearance of the first symptom, which was in this case hematuria. In tuberculosis the kidney is likely to be enlarged and is usually tender. There is commonly pain in the renal region. The urine will show beside the blood a greater or lesser amount of pus and pelvic epithelium. The presence of a thickened ureter on the bleeding side is highly suggestive of tuberculosis, as are ulcerations or a localized area of cystitis about the ureteric orifice of the same side. The real test as to the tuberculous nature of the hematuria is the finding of tubercle bacilli in the urinary sediment or the production of tuberculosis in guinea pigs by inoculations of this sediment. In rare instances there may be small, well-walled foci of tuberculosis deep in the substance of a pyramid that have no connection with the renal pelvis. These may cause hematuria by congestion or interference with the renal circulation, and yet no tubercle bacilli may be found until such time as there is a connection between the focus and the renal pelvis. Cases of this sort are most confusing.

Our knowledge that a *chronic* nephritis may give rise to a hematuria is relatively recent. These hematurias differ from the bleedings occasionally seen in acute nephritis, in that they last much longer and are often profuse. They may occur in a nephritis of the medical type or in one due to an infection. The hematuria is usually intermittent and may extend over a very long period as in a case reported by Keersmaecker, when the bleeding lasted two years and a half. The hematuria may, however, be continuous and moderately profuse as in a case I reported before the American Urological Association in June, 1906, where the patient was reduced to marked feebleness after a month of hematuria. The hematuria is usually painless, but may be attended with uneasiness or actual pain in the flank. The kidney may be enlarged or not; it may be tender or non-sensitive. While excessive exercise and exposure to cold will usually increase the amount of bleeding, rest in bed even for a month, may not have any effect in diminishing it. This is one of the conditions in which a bilateral hematuria has occasionally been noted as in the cases reported by Legueu and Nicolich. The urine may at times show only blood, but a large proportion of the cases will show in addition to blood a few casts. When the hematuria depends upon a localized focus of nephritis, the casts may be found only when there is no bleeding or when it is relatively small in amount. At other times the blood passes the tubules too quickly to allow of clot formation. In some of the hematurias of the toxic type, other signs of a toxic nephritis may be present. The urine is sterile in the cases that are purely toxic in type, while it contains organisms in a considerable proportion of the cases of infectious origin. In the type due to infection, the bladder may show changes about the ureter, if present they will be much less marked than in the tuberculous cases, and the ureter itself will not be appreciably thickened. It may be very difficult at times to differentiate between the hematuria of chronic nephritis and that of malignant disease.

There are beside the above mentioned causes of renal hematuria others that are less common. Hydronephroses have been found in which the sac was filled with bloody urine as noted by Albarran. Should this occur in an open hydronephrosis as in Rovsing's Obs. IV., one would have a one-sided hematuria, which should be easy to recognize because of the elastic mass and the fact that a ureter catheter passed to the renal pelvis would drain off a large amount of bloody urine. No case of this sort has come under my own observation. A movable kidney may produce hematuria as has been pointed out by Albarran. The bleeding is as a rule slight. Unless there is a pelvic retention that becomes infected, the urine shows practically nothing but blood. There will be a palpable and movable kidney. I have seen but one case of this kind.

Cysts of the kidney may occasionally give rise to hematuria. Debaisieu cites a case in which a cyst as large as an orange situated in the lower pole of a kidney led to a long-continued and profuse hematuria. I have recorded the case of a patient in whom the rupture of a small retention cyst in the upper pole of the kidney on the 11th day after a prostatectomy led to death from hemorrhage, on the 23d day. In my patient an open-mouthed vessel was found in the edge of the ruptured septum between the cyst and the kidney pelvis. The invasion of the kidney by certain parasites such as the tenia echinococcus and distoma hematobium, may give rise to hematuria. In this country we see only cases that have acquired the disease elsewhere. The diagnosis will be evident from the finding of the cysts and hooklets in the one and the ova in the other. Rovsing records an interesting case of hematuria due to a supernumerary renal vessel bow-stringing the kidney pelvis. There is in fact, no injury, no disease, no abnormality of the kidney that may not under certain conditions give rise to hematuria. In a considerable proportion of these hematurias a diagnosis can be made, in some I believe a diagnosis is impossible without an exploratory operation.

Although the instances in which a hematuria has been actually proven to be of ureteral origin, are relatively few, some things suggest that they are more frequent than we have supposed. There are some reported cases where a kidney that has been removed for hemorrhage has shown no lesion, and yet the hematuria has not stopped at once, but as in the case I have cited, the bleeding has continued for a time, then diminished and finally ceased. These cases are very suggestive of a ureteral origin.

While we know that the ureter is subject to primary malignant growths, to kinks and strictures, all these are occluding in nature and not likely to cause bleeding from the ureter itself. On the other hand there seems no good reason to doubt the possibility of a papillomatous condition of the ureter, as occurs in other parts of the urinary tract, this, or varicosities, or ulcers due to infarctions, I should expect would be much more likely to give rise to hemorrhages. My own experience with hematurias of ureteral origin has been limited to the reported case and to instances of hematuria accompanying the passage of renal calculi; the latter are too characteristic to require comment. In my case had the hemorrhage been due to a stricture or kink, the upper portion of the ureter would have been dilated. It was not. The lapse of time since operation is an argument against malignancy. Primary malignant disease of the ureter is rare, and in the reports of the few cases with which I am familiar, bleeding has not been a prominent symptom. This was the case in the instances reported by Adler, Metcalf and Vorpahl. Impacted calculus also seems improbable as there was no history of colic. The most probable cause seems to me to be either a papillomatous or varicose condition of the ureter or an ulcer. With the exception of the cases of calculi, our present knowledge of the causes of ureteral hematurias, and the different symptoms that they produce, is so small that we are unable to distinguish one from another. The most that we can expect to do is to recognize that a given hematuria is ureteral in origin.

To recapitulate: We have but one way to definitely distinguish between a hematuria of the upper urinary tract and one of bladder origin. That is by means of cystoscopy. Simple inspection of the ureteric orifices in some cases, combined with catheterization of the ureters in others. We can distinguish between a hematuria of ureteral origin and one of renal origin by passing a ureteral catheter and noting if the urine from the kidney pelvis is bloody as well as that from low in the ureter. In a large proportion of the cases of renal hematuria, we can arrive at an accurate diagnosis of the cause of the bleeding by means of a careful consideration of the symptoms combined with an accurate examination of the patient and study of his urine. Our knowledge of ureteral hematurias is so small that we can at present do little in the way of determining their underlying causes.

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VESICAL HEMATURIA.[1]

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THE subject of this paper is hematuria of vesicle origin, as distinguished from renal, ureteral, and prostatic bleeding.

CAUSES.

The causes of vesical hematuria may be general or local. Among the general causes are the hemorrhagic diatheses, purpura, scurvy, and hemophilia; also specially malignant types of certain infectious diseases, as malaria and typhus fever. In both these groups of cases the bleeding usually occurs from other mucous membranes as well as from the bladder, the hematuria being but one manifestation of a severe general disease, whose recognition is usually not difficult, and further consideration of which is here out of place.

Hematuria may result also from the action of chemical poisons such as cantharides, turpentine, phosphorus, and particularly the poisonous gases set free in the manufacture of certain aniline dyes, notably fuchsine. These poisons, to be sure, usually affect primarily the kidneys, but may also cause bleeding from the bladder, especially the aniline poisons which seem to exert a peculiarly selective effect on the vesical mucosa. Many cases of strangury and vesical hematuria have been reported among workers in aniline factories by Leichtenstern[1] and Rehn.[2]

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[1] Read before the N. E. Urological Society, Hartford, Conn., October 22, 1906.

It is, however, with the local causes of bleeding from the bladder that we are particularly concerned. These fall into the following four groups:

1. Circulatory Disturbances.
2. Trauma.
3. Infection. Bacterial, or Parasitic.
4. New Growth.

Under the head of *Circulatory Disturbance* should be mentioned the well-known phenomenon of hemorrhage following the rapid emptying of a distended bladder, in cases of retention of long standing. This is explained as the result of sudden lowering of intravesical pressure. Passive congestion of the walls of the bladder resulting from mechanical obstruction to the venous current, has been assigned as a cause of vesical hemorrhage, and a very few authentic cases have been reported. Langenbeck[3] has reported one such occurrence, in a case of cirrhosis of the liver.

Varicose veins of the bladder wall, or vesical hemorrhoids, as they are sometimes called, have been demonstrated as a source of bleeding by Dittel,[4] and a few others. This condition undoubtedly does exist, and may be aggravated by circumstances causing passive congestion of the pelvic organs, as in certain large abdominal tumors, or pregnancy.[5] Varicose veins of the bladder, however, are extremely rarely the cause of vesical hemorrhage, and with the improvement of the cystoscope, and the technique of its use, less and less is heard of this condition.

Trauma—This may come from without or within. Rupture of the bladder by external violence, at a time when the organ is distended is not rare. There is more or less bleeding accompanying the other symptoms of this condition, the cause of which is always strongly suggested by the history of the case. Gunshot, and other external injuries of the bladder, are self-evident causes of bleeding. Contusion of the bladder, without actual rupture, may occur in child-birth from pressure by the fetal head, and lead to post-partum hematuria. Trauma from within the bladder may be the result of instrumental treatment, or, what is of more interest and importance, may be due to the presence of foreign bodies, or calculi within the viscus. The latter condition is one of the more frequent causes of vesical hematuria.

Infection—Any acute inflammation of the bladder may be accompanied by hematuria of greater or lesser degree. Often the microscope is required to detect the presence of blood, but occasionally in cases of severe acute cystitis it may be a prominent feature. As a rule hematuria is not a characteristic symptom of cystitis, except in cases of tuberculosis and gonorrhea of the neck of the bladder.

Chronic inflammatory processes leading to necrosis of superficial layers, and ulceration, may, by erosion of small blood vessels, result in hematuria.

That rare, but seemingly authentic disease entity, ulcus simplex of the bladder, like its prototype of the stomach, may be the cause of severe bleeding. The etiology and pathology of this condition is as yet obscure. A number of cases have been observed post mortem in which the ulcer progressed in perforation of the bladder wall.

In tuberculosis of the bladder, ulceration is common, hence also hematuria. This may be the first sign, and often the only one; it always appears at some time during the course of the disease.

Syphilis of the bladder should be mentioned as a possible cause of hematuria, but must be very exceptional.

Under local infection, should be included the results of the invasion of two parasites, the Distoma Hematobium and the Filaria Sanguinis. These parasites are rarely met with in this vicinity, but are common in the tropics and may be imported here. The Bilharzia parasites show a special predilection for laying their eggs in the wall of the urinary bladder. These break through the mucous membrane, setting up irritation and bleeding. The bleeding from this cause may be severe. The presence of Filaria in the circulation may lead to a blocking of the lymph channels of the bladder with the organisms; these may rupture, with consequent hematuria and chyluria.

New Growths—Perhaps the commonest cause of vesical bleeding, or at any rate, the commonest cause of the severe bladder hemorrhages, is new growth. Of these only papilloma, sarcoma, and carcinoma need be considered; the other forms are not only exceedingly rare, but unlikely to cause bleeding. The characteristic of hematuria of neoplastic origin is that it is intermittent, at least at first, usually painless, except in malignant cases, unassociated with rest or motion, and unaffected by any therapeutic measure. In 20 out of 41 cases of bladder tumor at the Massachusetts General Hospital, studied by me, it was the first symptom; in many it was the only one. In benign cases the bleeding may persist for years without other symptoms. In one case in the series referred to, bleeding was intermittent for 16 years before operation. Often the bleeding is alarming and may be fatal. In this connection I may cite two instructive hospital cases:

CASE 1. A laborer, sixty years of age, was brought to the accident department of the hospital, December 22, 1900, with a history of having passed blood with his urine for 6 months. Three weeks ago the hematuria became constant. One week ago he took to his bed and has failed rapidly since.

He was profoundly anemic and nearly moribund when brought to the hospital. In spite of irrigations of the bladder with various styptics, the bleeding continued, and he died on the third day after entrance.

Autopsy revealed, as the source of hemorrhage, two pedunculated tumors, the larger 4x5½x½ cm., about 2 cm. apart, springing from the mucosa of the bladder-wall just above the left ureteral orifice. They were typical villous papillomata. There was no evidence either macroscopical or microscopical of epithelial infiltration of the bladder wall.

CASE 2. A man, fifty-five years old, entered the medical department of the hospital, June 1, 1901, with the following history: An attack of hematuria 1½ years ago; at this time there was some pain referred to the penis. One year later there was another severe attack. For the last three weeks he has been passing blood and clots constantly. Has had heart trouble for years.

The bleeding continued, uninfluenced by various internal remedies, and he died June 7. At autopsy, atheromatous encocarditis of the mitral valves was found, and fibrous endocarditis of the tricuspid valve, with hypertrophy and dilatation of the heart. The bladder contained much clotted blood and showed on its posterior wall a small villous papilloma of the most innocent type, as far as anatomical structure was concerned. Sections through the tumor and the underlying bladder wall showed absolutely no infiltration of the latter. Other organs were not remarkable.

In neither case was operation performed. In the first, on account of the poor general condition of the patient; in the second the severity of the cardiac lesions undoubtedly explains why surgery was not resorted to.

The tendency to bleed on the part of these papillomatous tumors is accounted for by their extremely delicate structure; the filamentous connective tissue processes which are covered with layers of epithelial cells, are often extremely vascular. In the act of urination, with the shutting down of the bladder walls upon them, it is not strange that these delicate villi should become detached, thereby rupturing blood vessels of no mean size. Sooner or later, in cases of bladder tumor, a train of secondary symptoms is sure to arrive, due to infection, with consequent cystitis, pyelitis, pyelo-nephritis, etc., or to mechanical blocking of the inflow or outflow of urine, resulting in hydro- or pyonephrosis, or retention.

DISTINGUISHING FEATURES OF HEMATURIA OF VESICAL ORIGIN.

Before taking up the differential diagnosis of these different causes of vesical hematuria, let us consider what, if any, are the general distinguishing features of a hematuria of vesical origin.

The *color* of the urine is no criterion as to the source of hemorrhage. Bright-red bloody urine may result from a renal, vesical, or prostatic lesion. A brownish color due to altered blood, supposed to indicate that the blood has been mixed with the urine for a considerable time, and hence pointing to a renal origin, is of no special import, as it occurs in cases of ulcerated new growth of the bladder, also in stone, or hypertrophied prostate; in fact, wherever there is infection with bleeding.

Clots are found when the bleeding is profuse, whether from bladder, prostate, or kidney. Worm-like clots, if a catheter is not used, should suggest casts of the ureter, and speak for a renal or ureteral source of blood; they are not common, however, and must be differentiated from clots of a larger diameter formed in the urethra.

Microscopical examination of the urinary sediment may throw considerable light on the source of the bleeding, though in most cases where the bleeding is profuse, formed elements other than blood corpuscles are very difficult to find. The morphology of the blood corpuscles themselves, whether normal or crenated, swollen or fragmented, or otherwise distorted, is of no practical significance as to their origin. The presence of casts points to a renal origin, especially if blood is adherent to them. Strips of squamous bladder epithelium are suggestive of a vesical source. The finding of small epithelial cells is of little value, as it is practically impossible to differentiate between the small cells of kidney, ureter, deep layer of bladder, and urethra.

Small fragments of a villous growth may rarely be found in the sediment; their recognition is by no means always easy; if unmistakable, a tumor of the bladder may be diagnosed with reasonable certainty, though it should be borne in mind that these tumors occur also in the pelvis of the kidney, and it is not inconceivable that detached fragments might make their way down the ureter.

Character of the Bleeding—If the urine is equally bloody during the entire act of micturition, it is not significant between prostatic, vesical and renal hematuria. If the blood comes at the end of the act, so-called terminal hematuria, it means either a prostatic, or neck of the bladder lesion. According to some authorities, terminal hematuria may occur in renal bleeding, the blood settling to the bottom of the bladder, and coming away last. This, I think, is a purely theoretical condition, and is extremely unlikely.

Character of Accompanying Symptoms Associated with Hematuria—These are often of great value in locating the site of bleeding. Symptoms on the part of the bladder accompanying bleeding are presumptive evidence that the cause lies within that organ. Evidence of this kind should not be relied on too much, however, for the symptomatology of prostatic and bladder lesions are notoriously alike, and disease of the kidney is often manifested by irritability on the part of the bladder, as in tuberculosis, for example.

There are then no absolutely distinguishing characteristics of hematuria of vesical origin. While intelligent consideration of the history and observation of the character of the bleeding and accompanying symptoms, together with routine examination of the patient, and the urine, will indicate with sufficient correctness the locus and cause of a urinary hemorrhage in many cases; more often, hematuria presents a difficult problem which can only be definitely solved by the more delicate tests of microscopy, animal inoculation, and cystoscopy.

DIFFERENTIAL DIAGNOSIS.

Eliminating those causes of vesical bleeding, which are self-evident from the history, in connection with a routine examination, let us consider in some detail the differential diagnosis of those which present some difficulty.

Of the causes classed under the heading of circulatory disturbance, only that extremely rare condition, *varicose veins of the bladder,* is beyond the scope of the ordinary means of examination. This requires the use of the cystoscope for its determination, but, as already mentioned, with improvement in the technique of cystoscopy less and less is heard of it. Personally, I have never observed it.

Of the causes classed under the heading of trauma, only *stone in the bladder* is likely to give difficulty. The bleeding associated with this condition is quite characteristic, in that it ceases with rest, and is aggravated by motion; there are in addition the usual symptoms of stone. The passage of the searcher will establish the diagnosis in the typical case; if this fails, owing to the pocketing of the calculus in a pouch of the bladder wall, the cystoscope will reveal the true condition.

Of the local infections of the bladder leading to hemorrhage, the two rare forms of *parasitic origin* are easily recognized; in the case of the Distoma Hematobium, by the finding of the characteristic ova in the urine; and in the case of Filaria, the presence of chyle in the urine, should suggest the truth, and the finding of the embryos in the blood confirm it.

Tuberculosis of the bladder is a frequent cause of hematuria, the bleeding being often the first sign of trouble, as in tuberculosis of the lungs. On the other hand, the bleeding may be long delayed; but always occurs sooner or later in the course of the disease. It may be profuse, or very slight, even microscopic; it may be terminal. Pain, and frequency of micturition soon appear. The urine is usually acid, and contains more or less pus, in addition to the blood, and, what is more important, tubercle bacilli. The finding of acid-fast bacilli in a catheter specimen, or a positive guinea pig inoculation establishes the diagnosis of tuberculosis, but does not locate the process in the urinary tract. Primary tuberculosis of the bladder is rare; it is usually secondary to tuberculosis of the kidney, prostate, or genital organs. Palpation will usually show from which of these sources it comes; if not, the cystoscope may, and should be resorted to, although as a rule cystoscopy of a tuberculous bladder is a procedure not to be entered upon lightly.

Simple Ulcerations, or perforating ulcer of the bladder, as a cause of hemorrhage, can be diagnosed during life, only by the cystoscope, or by operation; this condition is to be differentiated from tuberculosis by the clear-cut margins of the ulcer, and by the absence of tubercle bacilli in the urine. Further post-mortem study of this rare condition is required to put it on a firm pathological basis.

The hematuria of *severe acute cystitis* is made manifest by the onset and character of the disease with its accompanying symptoms of strangury and tenesmus. When the neck of the bladder is the seat of the lesion, the bleeding may be terminal. The symptoms usually subside fairly promptly with appropriate therapeutic measures. The cystoscope should not be required for the determination of this condition.

The characteristics of the hematuria of *tumors of the bladder* have already been mentioned. In the early stages of benign growths, when the bleeding is intermittent, painless, and without apparent cause, it cannot be differentiated from the bleeding of a kidney tumor, early kidney tuberculosis, or essential renal hematuria, except by the use of the cystocope. In the later stages, when infection with its train of attendant symptoms has occurred, the condition may closely simulate prostatic hypertrophy with hemorrhage, or stone in the bladder, or ulceration, and the cystoscope is again called into use.

The hematuria of malignant disease of the bladder is usually continuous and accompanied by pain. In these cases, rectal or vaginal examination will often reveal induration of the floor of the bladder, or a distinct mass. To differentiate cancer originating from the prostate, from that primary in the bladder, is often impossible by mere inspection or palpation, requiring careful microscopic study.

The value of cystocopy in the diagnosis of tumors of the bladder cannot be over-stated. Data as to the size, situation, character, and number of growths, also as to the advisability of operation can be obtained by this means only.

The method is applicable to all cases with the three following exceptions: (1) where the urethra is impassable to the cystoscope; (2) where hemorrhage is profuse and persistent; (3) where the growth on account of its size and position prevents the necessary manipulation of the instrument. The first obstacle can usually be overcome by appropriate methods of dilatation, the second, by appropriate irrigation, or by the selection of a favorable opportunity, and the last is very unusual.

In a personal experience of cystocopic examination of tumors of the bladder, embracing only eight cases to be sure, hemorrhage proved no obstacle; in only one case was the bleeding troublesome, and in this case irrigation with adrenalin solution controlled it sufficiently to get a very good view of the growth. As a rule, if a bladder tumor is suspected to be the cause of hematuria, cystoscopy is better done in an interval between hemorrhages. If a renal lesion is suspected, the reverse is true.

The use of the searcher, or lithotrite, in diagnosing cases of new growth of the bladder, is to be condemned on account of the liability of provoking severe bleeding. Moreover, if a growth encrusted with urinary salts, a not uncommon occurrence, is mistaken for a stone, and treated as such, the results may be disastrous.

CONCLUSION.

In conclusion it may be stated that in all cases of persistent hematuria, in which the cause is not obvious, the cystoscope should be resorted to, and its intelligent use will not only settle the question of the source of the bleeding, whether prostatic, vesical, or renal, but often the nature of the lesion itself. In the exceptional cases in which the instrument cannot be used, if the bleeding is urgent, immediate suprapubic cystotomy is indicated, not only as a diagnostic, but also as a life-saving measure.

1. **Leichtenstern:** Ueber Harnblasenentzundung und Harnblasengeschwülste bei Arbeitern in Farbfabriken. Deutsche med. Wchnschr., 1898, xxiv., 709.
2. **Rehn:** Arch. f. klin. Chir., Bd. xiv., S. 484.
3. **Langenbeck:** Handbuch d. Anatomie. Göttingen.
4. **Dittel:** Ueber Blastenbluntungen, etc. Wiener allg. med. Ztg., 1891.
5. **Zuckerkandl, O.:** Handbuch der Urologie. Band i., S. 752.

HEMORRHAGE OF URETHRA AND PROSTATE.[1]

E. J. McKnight, M. D., Hartford.

OUR subject includes all those hemorrhages which occur in the urinary tract at any point distal to the vesical neck. They are due to traumatism, diseases of the organs and their sequelæ and malignant growths.

Traumatism may be the result of the introduction of foreign bodies into the urethra, either by the patient himself, or by the surgeon in attempts at catheterization, by accidental causes acting from without or by surgical operations made necessary by diseased conditions of the organs. Of injuries due to the introduction of foreign bodies by the patient little need be said in this paper. Caustic injections and hot sounds may cause hemorrhage from the burns which they produce. Hemorrhages from the attempts at the introduction of catheters, sounds, and bougies can only assume serious proportions when there is pre-existing disease of the parts or when the operation has been performed by one unskilled in their use, and interests us here only in the matter of treatment which will be considered later.

In operations upon the urethra or prostate serious hemorrhages sometimes occur at the time of operation when they can be readily controlled by ligature or packing of the wounds. Severe hemorrhages sometimes follow operations upon the prostate but, as was stated by our secretary, Dr. O'Neil, in his paper upon "Sequelæ of Prostatectomy," read at the last meeting of this branch, they rarely occur except in those cases where the removal of the prostate has been incomplete.

Hemorrhages occurring in the course of acute inflammations of the urethra, seminal vesicals and prostate usually require little or no treatment in addition to that of the conditions with which they are associated. The sequelæ of inflammatory diseases, however, occasionally give rise to hemorrhages of considerable extent.

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[1] **Read before the N. E. Urological Society, Hartford, Conn., October 22, 1906.**

In stricture of congestive type, instrumental interference and sexual excitement may give rise to considerable bleeding, and hemorrhage is often a complication of severe chordee.

Malignant disease originating in the urethra is not common and usually commences at the bulbous portion or near the meatus, the predisposing causes being urethritis and stricture. Cancer of the prostate is not uncommon. The amount of hemorrhage in these conditions is variable. Varix of the veins in the prostatic urethra is often present in prostatic disease, a condition which Fenwick believes to be the cause of the soiling of the shirt with blood between the acts of urination in prostatics.

The diagnosis of hemorrhage from the urethra as in other parts of the urinary tract is based upon the history, the examination of the urine and the examination of the organs themselves. The history of an accident to some portion of the urethra, a previous urethritis or operation upon the prostate, would naturally point to those parts as the seat of a given hemorrhage. Hemorrhage appearing at the meatus independent of urination, is positive evidence that the blood came from some part of the urethra anterior to the triangular ligament, but the amount of blood which flows out is by no means an indication of the extent of the injury as clots often form quickly and prevent outward flow of blood and urine. Fluid blood appearing at the beginning of the stream comes from the deep urethra or prostate. When, however, hemorrhage from the prostate is extensive, a part of the blood will flow back into the bladder and may discolor the entire contents. In these cases there will probably be clots with the first part of the urine voided, and these will be large and long, veritable blood casts of the urethra which can be easily distinguished from the small clots, long or short, which come from the ureter. When hemorrhage is in the bladder, the blood is more apparent at the end of the stream and the clots are larger and irregular. In all doubtful cases, direct examination of the parts with the urethroscope will insure a positive diagnosis.

In slight hemorrhages which quickly subside, little need be done. When, however, the hemorrhage continues and there is no evidence of rupture of the urethra, a retention catheter may be introduced into the urethra and pressure applied from without by cold water coil or bandage. If there is a solution of continuity in any part of the urethra, the treatment will resolve itself into the prevention of extravasation with its direful results, and the prevention of the formation of stricture, matters which do not concern us here. It is important to remember, however, that in the introduction of a catheter following injury to the urethra, it is always safer to use one with a Mercier tip, as it will follow along the roof of the urethra which is not so often injured as the floor.

The treatment of hemorrhage from injury in this locality is always intimately associated with the treatment of the conditions which give rise to the hemorrhage, and so far as the urethra is concerned, should be aimed at, not only the control of the hemorrhage, but the restoration of the normal functions of the parts.

As prophylactic measures, the very careful use of instruments, the possible introduction of a solution of adrenalin into the urethra before catheterization in cases showing a tendency to hemorrhage, prevention of sexual excitement, and the complete and careful removal of all portions of the prostate may be mentioned.

When there has been extensive hemorrhage in the deep portion of the urethra and a large amount of blood has been drained into the bladder, great difficulty may be experienced in getting rid of the clots which form in that organ. The fluid portion of the blood and urine should be drawn off with a catheter, an operation which may be attended with great difficulty from the filling up of the catheter with clots. Attempts should, however, be persisted in, alkaline solutions through a double-current catheter being used at frequent intervals. On account of the decomposition of the clot which usually occurs, antiseptic injections may have to be continued until the entire clot is disintegrated and washed out. Injections of pepsin and hydrochloric acid have been recommended to dissolve the clots. Urotropin, salol or remedies of that class should always be used to maintain the bladder in as aseptic condition as possible.

The control of the hemorrhage in the deep portion of the urethra, especially in cases following operations upon the prostate, is sometimes very difficult. Solutions of adrenalin and a 10 per cent. solution of antipyrin, are often used with good results, while spirits of turpentine internally has some value. The hemorrhage may sometimes be so great as to necessitate opening and repacking the wound. Pressure inside the urethra and bladder may sometimes be used advantageously as in a case which occurred in the writer's experience a few years ago.

An old gentleman had had a Bottini operation in Philadelphia a few weeks previous to his visit to Hartford. Suddenly in the night he was attacked with severe hemorrhage, and when seen by me, the bladder was distended with blood and urine, and blood was oozing out of the meatus. Great difficulty was experienced in relieving the distention on account of the filling up of the catheter with clots, but by persistent efforts partial relief was obtained, although portions of clots remained in the bladder for a number of days. Oozing from the deep urethra persisted and was finally relieved in the following manner:

A double-current metal catheter, over which had been drawn an ordinary rubber condom, was introduced into the bladder and the condom tied tightly around the staff just outside the meatus. A fountain syringe filled with cold water was fastened to the inlet and the tube leading from the outlet partially closed by a clamp. In this way the condom was distended in the entire urethra and lower portion of the bladder, and the pressure regulated by the height of the bag. Upon withdrawing this two or three hours later, the hemorrhage had entirely ceased and did not return, the patient making a good recovery so far as the hemorrhage was concerned.

The writer does not claim any originality for this procedure, it having been suggested to him by an article which appeared in one of the medical journals several years ago, in which a physician reported a case of obstinate hemorrhage from the uterus, following miscarriage, which he controlled by the use of a condom tied to the end of an ordinary syringe tube, his comment being that "It was unique that an agent which had failed to prevent a catastrophe should be willing to spread itself to hinder a fatal result."

DISCUSSION.

Dr. Ramon Guiteras of New York: I made a few notes on the car coming up, but most of the points have been brought out and many more in the papers which have preceded me. As has been stated hematuria is always due to some trauma or lesion of the urinary tract. These diseases are inflammation, ulcer, tumor, stone, tuberculosis usually, and some of the rarer conditions as Dr. O'Neil and others have mentioned. We have been taught that blood mixed with acid urine comes from the kidney; that urine containing worm-like casts comes from the ureter, and urine mixed with clots and red blood comes from the bladder, and that hematuria due to prostatic trouble or at the posterior urethra, follows micturition, whereas, that coming from the anterior urethra precedes the urine. Of course urine in any disease of the urinary tract may be acid unless there is an old infection, when it changes the reaction. The principal points in the diagnosis of hematuria are locality of pain, the presence or absence of renal elements, the presence of crystals, tumor cells, epithelia, and a thorough examination of the genito-urinary tract, and perhaps to resort to exploratory operation, and also to radiography. Usually when hematuria is accompanied by pain in the loin it is due to kidney disease. When this pain radiates to the groin or pubes, it is ureteral or renal. Pain in the suprapubic region or high up in the perineum, points to the blood coming from the bladder or prostatic urethra. Tumor cells, crystals, a tuberculosis with renal elements, pain or tumor in the loin, points to the kidney, while the same with pain in the bladder with frequency of urination, points to the bladder as the source of the hemorrhage. There is one thing in all cases of hematuria that should be considered as important, and that is a thorough examination of the genito-urinary tract. The patient coming for examination should have the meatus first examined to see if there is an escape of blood. The patient then urinates. If the blood is in the *first part of the urine it is at the meatus.* If there are clots in the urine and the urine is bright red in color, it is from the bladder. If it contains the worm-like casts, it is ureteral and if it is of dark color, it is renal. After this the remainder of the examination should be completed. First palpate the prostate. It shows us whether the prostate is malignant or tubercular, usually by the conformity and consistence of the gland. Several nights ago a patient was brought in with a tumor of the prostate. The patient had constant hematuria. I examined the prostate and by simply touching it I knew it was normal. The man was sixty-seven. Cystoscopy showed that it came from a tumor of the trigone of the bladder, extending to the base of the prostate. Then a urethral examination should be made. If a stricture is found we should think of cystitis with obstruction. Or, if the prostate is found to obstruct the urinary tract, we must think of that. If we find the urethra free as well as the prostate, then we should cystoscope our patient. We can tell by inspection of the bladder whether there is tuberculosis, tumor or stone. If we find that the bladder is healthy, we must then look above, and the renal cause of hematuria is what I wish to speak about. In the first place, trauma. A patient was stabbed in the back by a stiletto. The kidney, when the patient came into the hospital, was slightly enlarged. The patient was passing much blood in the urine. The kidney at the end of two days was slightly enlarged and almost impossible to outline, but the hematuria stopped. From this on the patient's recovery was uneventful. About the same time a patient entered Columbus Hospital who had received a blow in the loin. He had a tumor there the size of a cocoanut. The kidney had been ruptured and the urine was escaping into the renal fossa. In his case the hemorrhage persisted over two weeks. The tumor was gradually absorbed and there were no ill effects. We had two other cases, one had fallen from a scaffold. Both patients had tumors in the loin and the anterior portion of the abdomen was large as a football, and another had hematuria. I opened both and evacuated a large amount of mixed blood and urine. In one case I had to remove the kidney, and in the other there was little ill effect except that its function was impaired. Why they were both shut off I cannot tell. On opening the abdomen in the first case, I found the intestines spread out like flat ribbons between the tumor and the anterior peritoneal wall. In tumor cases the relation of pain and exercise is not as important as it is in a stone not producing hematuria. It may cure it in time and there is little pain unless blood clots are passed. There is one interesting condition I would like to speak of in tumor of the kidney on the left side, and that is varicocele. This occurred in a case of hypernephroma, and as soon as the kidney was removed, the varix disappeared. ***Bleeding from stone of the kidney almost always follows exertion,*** and the pain in cases of hematuria connected with renal calculus is often very acute. In the case of stone if no infection is present, the kidney cannot be felt. In infection it is enlarged and felt as a large tumor. In a case of stone in the kidney we also have the renal elements as a diagnostic proof, and the casts in stone of the kidney contain crystals. One of the tests of renal calculus is after catheterization to inject the pelvis of the kidney with fluid. This gives a pain and is often followed by hemorrhage. Last Saturday I had two supposed cases of renal calculus. The second case was one who had been subjected to this diagnostic trial. There was no calculus, but I think the patient had a beginning hypernephroma. In the other case the kidney was somewhat enlarged, although it was healthy, and nothing was found, although the patient had hemorrhages after exercise. I brought him to the office and had him examined and took his urine before and after. It contained ***but few blood cells though I found considerable blood in his urine.*** The X-ray in stone is valuable if you see the shadow. There is nothing more difficult than to explore a kidney in a case where the ribs are well down and a very short pedicle to the kidney, and more difficult if the patient is fat. Having separated the kidney, if one assistant presses the abdominal wall well down anteriorly, and then the ureter is separated from the vessels of the pelvis, the ureter caught with a blunt hook and pulled back and a rubber band placed around the pedicle and pulled forward, then when you make your incision, you can better palpate the kidney; that is the best way I know. Regarding the question of renal hemorrhage. When we find blood in the urine, and when on one side we have a large kidney and much abdominal rigidity, and when there is pain on that side and there is a temperature, we naturally think that one the most diseased kidney. When we catheterize that patient, as soon as we get into the ureter on the supposed unhealthy side, the urine is abundant and clear. On the other side we will find a half ounce of urine suddenly come out through the catheter which is pus and water with no urinary color. I operated on the side that had no pain and removed a pyelonephrotic kidney. The other kidney became incapacitated and I had two specimens to show. The hemorrhage had all been from the more healthy of the two kidneys. Dr. Keefe's remarks and those of Dr. Chute were interesting and important. We can have unilateral hemorrhage in cases of nephritis. I had such a case in which it was entirely cured by nephrotomy. Almost all the renal surgeons, especially Pousson and Israel claim that should be the treatment of unilateral nephritis. I had a most humiliating experience in a case of hematuria. The patient was passing bright red urine. We cystoscoped him and no blood came from either ureter. The urine was taken to Dr. Heitzmann and another sample to Dr. Brooks. One said it came from the seminal vesicles and the other said it was from the bladder. There seemed to be a papilloma and the blood ran down the wall of the bladder. It was operated upon by suprapubic cystotomy. We found no tumor.

DR. CHAS. S. STERN of Hartford: *Kidney*—Hematuria is perhaps the most constant symptom of renal injury, occurring in over 80 per cent. of cases. But as Fuller has shown, the most extensive renal trauma may be unattended by severe symptoms or the passing of any blood in the urine. Dr. Keefe's case is very likely one of those cases of severe long-continued bleeding, described by Senator and called by him "Renal Hemophilia." We may also have severe bleeding in beginning renal tuberculosis, with but slight pathologic change in the organ.

Ureter—Hemorrhage may be caused by the ureter catheter. We may almost expect to get blood in half the cases catheterized. Possibly by slight abrasions of the surface during passage of catheter, or by the hyperaemic condition engendered by the presence of the catheter, especially if the canal is of small caliber. In the first instance, bleeding occurs mostly at the beginning and gradually lessens, while in the second, no blood cells will be seen at first, but they come later and increase in amount the longer the catheter remains in. By pushing the catheter further, beyond the wounded or hyperaemic spot we may avoid the error of locating such hemorrhage as from the kidney or ureter proper.

Bladder—Certain characteristics of hematuria are important, *e. g.*, bleeding brought on by movements of the body speaks for stone; while if it comes and goes irrespective of body motion, it is more often due to tumor. In stone again, the amount of blood is generally small, while in tumor it is more apt to be profuse and difficult to control.

Urethra—Case of seminal vesiculitis in a married man of thirty-six, a saloon-keeper, who was obliged to drink much, and was standing most of the twenty-four hours, while at the same time he was greatly run down from business worries. He had one involuntary emission which was bloody, and after that noticed that each coitus was productive of sanguineous semen. He recovered perfectly. A case of profuse hemorrhage from the anterior urethra which could be controlled but temporarily on several occasions. Finally a spot of erosion was located by means of urethroscope, and direct application of fifty per cent. $AgNO_3$ arrested it permanently. I had another case of hemorrhage from the bulbous portion following dilatation of stricture, which continued four days. Locating the torn and bleeding surfaces through the urethroscope, and simultaneously making applications sufficed to control it entirely.

I have frequently observed while examining the posterior urethra through the urethroscope that the pre-prostatic portion, the part between the sinus pocularis and membraneous portion, is usually hyperaemic, or much engorged. And this bleeds readily when instruments are carelessly used here. I think the papers have been exceedingly instructive and have added largely to our knowledge of a very baffling subject

Dr. Meyer, Hartford: The subject before us, hematuria, having been gone over so exhaustively by the papers read, and made so plain and tangible, I shall not waste time in repetition. Rather permit me to give a few personal experiences of hematuria from the effect of irritants, and also from the infection of fever.

A workman stepped into a vat of boiling lime and lost extensive tissue below the knee of one leg. The raw surface was dressed with Lister's paste and sheathed in tin foil. The patient promptly exhibited all signs of acute carbolic acid poisoning, and very frequent hematuria. In fact, a considerable quantity of blood was lost in this manner, and blood in the urine lingered beyond all other symptoms. No sequelæ followed. At another time a lymphatic lad received chlorate potassa fifteen grains three or four times daily to assist in the first stages of a urethritis. I had used it extensively in that way a dozen years ago, and I thought with advantage. On the fifth day this lad exhibited all the signs of violent poisoning. As the dose was well within limits there must have been a special susceptibility. Extreme pallor, cyanosis of the mucosæ, green vomit, collapsed face, drawn-in abdomen, and profuse blood in the urine, with very cold extremities showed beside a clear sensorium and absence of pain. The hematuria persisted to the end. On the eighth day, when seemingly convalescent, the young man sat up in bed to take a cup of coffee and dropped dead. During an epidemic of yellow fever at Newberne, N. C., in 1864, I was in charge of the Foster General Hospital. Quite a number af patients developed hematuria. It came on with black vomit, and, in a modified degree, outlasted it. These were by no means the fatal cases, as a rule. There was a slight tinge of blood in the urine of almost all the patients. In the charge of typhoid and small-pox field hospital during the Civil War, having thirty-four patients in one and thirty in the other, I had no cases of hematuria. Two years ago I treated for three months an office patient who seemed to exhibit what has been called bleeding from healthy kidneys. There was no symptom whatever aside from the hematuria. He was a robust young man, a Pole, who never stopped work, did not lose appetitie or sleep, and whose strength appeared not impaired. He voided about a pint of deeply blooded urine whenever he called. At last the blood diminished and finally disappeared. No other abnormality whatever was demonstrable in the case. The remedies that have been mentioned are orthodox—rest, cold, opium. The astringents are of use. Tannic acid is changed to gallic acid in the urine. Other remedies arrive in the bladder in an efficient form. Adrenalin should be tried. Where the cystoscope can detect a local lesion a silver application may succeed. But hematuria is rarely dangerous in itself unless caused by a neoplasm, when the continuous loss of blood constitutes the danger. Mèmayer speaks of ecchymoses and infarcts in the kidney that have not broken and cause no show of blood in the urine. Those are discovered in the autopsy only.

Dr. L. Davis of Boston (closing): Regarding essential hematuria. Both cases were operated upon at the Massachusetts General. Everything appeared normal. A good sized section was removed, and Dr. Whitney, the pathologist, said it was absolutely normal tissue, and it was sent to the histological department at Harvard, as a normal kidney. In the other case the kidney was removed and it appeared perfectly normal, yet the surgeon removed it. I have the kidney now, but have made no paraffin section. Macroscopically there is no lesion. I felt all along as Dr. Chute does, but I have become convinced that there is such a thing as essential hematuria.

Dr. A. L. Chute of Boston (closing): We want to be careful in accepting essential hematuria and look more definitely for evidences of chronic nephritis. In my own mind it is chronic nephritis.

Dr. Edgar Garceau of Boston: Hematuria seems to be the obscure point. The French Society appointed two good men to look up this subject and their papers appeared. They reviewed the subject and analyzed every case that had appeared. They said essential hematuria did not exist. Dr. Chute says there are so many cases that one must be very careful in arriving at a diagnosis. There is no question but that most of them are hysterical hematuria.

Dr. R. F. O'Neill of Boston: I was asked to cystoscope a man who was bleeding at every jet. A nephrectomy was done but the kidney was said to be perfectly normal. It might have been hemorrhage from the ureter.

THE PATHOGENESIS AND TREATMENT OF THE SYMPTOM HEMATURIA.

By CHARLES GREENE CUMSTON, M. D., Boston, Mass.

HEMATURIA is above all met with in lithiasis, and it may be said that it is almost an obligatory symptom. A large calculus need not necessarily be present to cause bleeding from the kidney, because very small gravel, sand, crystals, or even a marked acidity of the urine may give rise to a very serious hemorrhage, quite out of proportion to the cause producing it. Abbe met with a patient with nephritic colic and severe hematuria coming from the right kidney, and upon incising the organ, he found a pyramid lined with a thin layer of sand; this was scraped off, the gland sutured and the patient recovered from all his symptoms. In lithiasis, hematuria is produced by the association of traumatism and congestion, but the latter appears to play the most important part, Pousson admitting that nephrorrhagia is generally due to a marked renal congestion, and less so to an extravasation of blood arising in lesions of the parenchyma or renal pelvis.

In point of fact, traumatism is hardly enough to explain the hematuria arising in cases of a large calculus immobilized in the kidney and where the patient is placed in absolute rest. Hartmann has recorded the case of a child, who, although immobilized in a plaster cast, had a hematuria due to lithiasis, and from this fact it would seem evident that the calculus may give rise to a continuous hematuria merely from its presence and consequently congestion of the kidney may rightly be considered as the factor of the loss of blood. The part played by congestion is still more marked in gouty patients and those having oxaluria. The latter may show blood in the urine, even when their kidneys are free from calculi or gravel and, under these circumstances, some traumatic action must come in play, a fact which seems evident because the crystals of oxalate of calcium with their sharp points more frequently give rise to hematuria than uric acid crystals.

However, it must also be admitted that congestion plays an important part, especially when a marked acidity of the urine has been known to cause a kidney to bleed, as is admitted by Morris.

Independently of traumatism and congestion, a third factor in the production of hemorrhage in lithiasis is encountered; I refer to sclerosis. Albarran admits a diathetic nephritis, which is under the dependence of the original cause of the lithiasis, and he points out in speaking of hematuria from unrecognized nephritis, that the three principle causes of renal hemorrhage are calculus, tuberculosis and cancer, and that lesions of diffuse nephritis are always encountered along with the principle affection. Then again, Desnos recognizes the fact that if renal congestion is left alone it becomes the starting point of an inflammatory process which finally ends in interstitial nephritis.

Generally speaking, the hematuria met with in renal tuberculosis is slight and transitory, but there are cases where the loss of blood is considerable and in itself is a danger to the patient. Occasionally a very marked hematuria is produced by very minute lesions under which circumstances no other symptom is present by which the diagnosis of renal tuberculosis can be made, so that the hemorrhage appearing to be the only manifestation of the disease, has led surgeons to interfere simply for it, and during the operation tuberculous lesions of the kidney have been discovered. Tuberculosis of the kidney giving rise to severe hematuria is usually cortical tuberculosis, the infection arising from the blood, the lesions often taking a long period of time to invade the remainder of the kidney and consequently hematuria is their only symptom. In these cases the loss of blood may extend over a considerable length of time, from a month and a half to even four years and a half. Dieulafoy and Pousson believe that severe hematuria is encountered in cortical tuberculosis where the nodules undergo their evolution in a very vascular zone and out of the reach of secondary infection. Like hemoptysis in pulmonary tuberculosis, the hematuria resulting from a renal tuberculosis is the result of vascular lesions or from attacks of congestion arising around the tubercles. Dupuy has pointed out that the first effect of tuberculous inoculation of the kidney by way of the blood, is an obstruction of the capillaries of the glomerulæ, soon followed by rupture of the vessels and being made evident clinically by hematuria. In a case recorded by Routier, histological examination showed a microscopical tuberculous lesion with a ruptured artery.

Such vascular lesions tend to provoke a hemorrhage, but they are not sufficient to give rise to a very marked bleeding, so that much must be attributed to congestion of the organ, especially in those instances where, at operation, the kidney appeared healthy or only presented some small miliary tubercles. Reynier, in speaking of these minute lesions which nephrotomy does not allow one to discover, says, that in these instances, the congestion and hematuria may be compared to congestive hemoptysis encountered in the commencement of pulmonary tuberculosis.

Renal congestion also increases the amount of the hematuria, even when the lesions are quite far advanced, and Dupuy says that when the lesions are advanced, congestive hematuria may occur, while Reynier has published a case where he attributes the renal hemorrhage to a zone of congestion surrounding a cavity in the kidney.

Hematuria is frequently met with in malignant disease of the kidney and is of important diagnostic value. It may arise at the very commencement of the disease, or, on the contrary, quite late in its development. Its importance is most variable. Sometimes the loss of blood is just enough to give a slight rosy tint to the urine, while, on the other hand, it may be so great in quantity and so rebellious to treatment, that it represents the predominating symptom of the disease. It should be pointed out, however, that no relationship exists between the size of the neoplasm and the abundance of the hematuria, so that congestion must be considered as the principal factor of the hemorrhage, especially when the growth is in its early stages of development and has not undergone an ulcerative process. Albarran believes that the hemorrhage is due to a secondary renal congestion and not to the growth itself, which may be situated in the cortical substance far away from the renal pelvis. He further says that hematuria in renal neoplasms may be due to the fragility of the vessels of the neoplasm itself, but he does not doubt that in the majority of cases the bleeding is due to an attack of congestion. Rovsing goes so far as to say that in some cases the hematuria arises in the healthy kidney from a reflex congestion, by functional hyperactivity and hypertrophy from compensation. The nervous system probably also plays a certain part in the production of the hemorrhage, and may be due to the rupture of the capillaries produced by the phenomena of congestion and stasis dependent on a vaso-dilating reflex having an unknown cause.

Retention may give rise to hematuria on account of the accompanying congestion. Guyon and Albarran ligated a dog's penis which, from the resulting retention, produced a purely congestive hematuria. In the first place, vascular arborizations on the mucosa were noted, then spots of ecchymosis appeared, and lastly epithelial desquamation and extravasation of blood occurred.

Albarran distinguishes a variety of hematuric uronephroses and among the twelve instances that he has collected, it is noted in some that the pocket contained a bloody liquid, while in other cases the patients had voided upon several occasions brown or reddish bloody urine and sometimes even during several successive weeks the urine contained a large amount of very red blood. Thus the retention or the uronephrosis acted on the congestion by producing a renal distention.

Hematuria from retention may also be due to prostatitis, carcinoma, calculus, compression of the ureter by a pelvic tumor, pregnancy, or a neoplasm of the bladder, ovary or uterus. The loss of blood may also be due to a movable kidney when a bend in the ureter or a valve obstructing the ureteral orifice exists. However, a movable kidney may give rise to hematuria from simple congestion of the gland without any retention or hydronephrosis being present. Pasteau has mentioned hematuria caused by congestion or an elongation and diminution of the vessels of the pedicle, all these conditions he believes being capable of causing circulatory disturbances resulting in hematuria. He also points out that hematuria may arise when renal congestion and retention are associated.

In prostatics the part played by retention has been admitted by Escat, but he attributes great importance to infection as well. He also points out that in these cases a hemorrhage ex vacuo may arise when the bladder is too quickly emptied.

Malignant disease of the kidney or bladder may give rise to retention by obliteration or compression of the ureteral orifice, but as far as carcinoma of the bladder is concerned, it has been upheld that the mechanism of hydronephrosis arising from vesical neoplasms is not usually the result of compression by a neighboring tumor, nor the obliteration from a neoplastic mass, but rather that of a progressive stricture resulting from the thickening of the bladder walls and peri- and intravesical sclerosis which accompany the evolution of malignant disease, especially in the indurated types.

The pregnant uterus may also give rise to a more or less complete retention by pressure on the ureter, and Guyon and Albarran have endeavored to explain the mechanism of hematuria during pregnancy. They believe that beside the circulatory hindrance, the renal retention of urine produced by compression of the ureters is a possible cause of renal congestion during pregnancy. The frequency of ureteral retention, the development of renal retention capable of giving rise to the symptoms complained of by the patient, or to the lesions found at autopsy have been demonstrated since the time of Cruveilhier.

Retention need not be complete, because a slight pressure on the ureter is enough to interfere with the flow of urine, bringing about a certain amount of stasis and congestion, which may result in hematuria. It is, however, well known that pregnancy may give rise to hematuria due simply to congestion from a direct circulatory hindrance, while Malherbe and Legueu, taking into consideration the presence of albuminuria and intermittent hematuria, are inclined to believe that there is also an interstitial or parenchymatous inflammation of the organ.

Occasionally hematuria occurs in cystic kidney and is one of the frequent symptoms of this affection and cases are recorded where the loss of blood was so marked that it led to erroneous diagnoses. Whether the case be one of polycystic kidney, serous cysts, or those arising from nephritis, it is probable that hematuria is due to the chronic nephritis present and from the renal congestion. Hydatid cysts of the kidney are rare, but they may also give rise to hematuria, even from the very early commencement of the affection. The hematuria of warm countries is due to the presence of parasites in the blood, and we will not consider this class further than to say that congestive disturbances in the capillaries and mucosa of the genital tract give rise to the loss of blood. It should also be pointed out that certain forms of hematuria, particularly that due to malaria, may occur without any renal lesion.

The hematurias due to hemophilia or the angioneurotic type

I shall also pass over in silence, as the pathogenesis of the latter is not well-known and probably of little import to urologists, but, on the other hand, the hematuria of nephritis is of the highest possible importance and this question I will now consider in some little detail. Hematuria is not infrequently encountered during an infectious disease or intoxication, and the renal hemorrhage in small-pox, scarlet-fever, measles, and so forth is well known. These hematurias are produced by bacteria acting either directly, or indirectly, by their toxins on the kidney, and at a later date from the lesions of sclerosis which may be engendered by the action of the poisons on the renal tissue.

In descending or hematogenic nephritis the renal gland gives evidence, in the very acute forms, of a violent congestion, occasionally with ecchymoses, hemorrhages and slightly marked epithelial lesions. In the acute forms one may meet the same lesions as in the very acute form, but with a hemorrhagic predominance, while in the prolonged types the elimination of the bacteria and their toxins finally ends in sclerotic lesions resulting from the reaction of the connective tissue, which in their turn cause the kidney to bleed.

Independently of the congestion of the inflamed organ and cell necrosis, one should take into consideration the lowered specific gravity of the blood, which may be so marked that it alone may give rise to profuse hemorrhage. Robinson lays great stress on the importance of the hemorrhagic action of certain poisons, certain toxins and dyscrasias, such, for example, as rickets, which decalsifies the blood, and, rendering it less coaguable, favors the production of hemorrhage.

The hematuria of acute intoxications due to cantharides, essence of mustard, sublimate, arsenic and so forth, have about the same pathogenesis, and animal experiments have shown that the hypodermic injection of cantharides causes a tumefaction of the kidneys, desquamation of the epithelium of the tubuli contorti in the first place, afterwards of the straight tubuli, and finally a leucocytic infiltration in the interstitial tissue. Intense congestive phenomena arise in the renal pelvis and may even produce hemorrhage.

In ascending nephritis lesions of sclerosis irregularly disseminated in the parenchyma, or even lesions of suppuration, may be produced and under these circumstances there is great congestion of the kidney, the organ being riddled with abscesses and ecchymoses, while phenomena of necrosis may also be present.

Slight, or even severe and persisting hematuria may be encountered in Bright's disease, and this loss of blood is due to congestive attacks which, aided by disturbances of the innervation, changes in the blood and vascular lesions, favor hemorrhagic raptus. Pousson believes that generalized arterial hypertension and cardiac hypertrophy, so frequent in the small contracted kidney, favor rupture of the vessels.

Besides Bright's disease there is another category of chronic nephritis which plays a very important part in the pathogenesis of hematuria. These nephritides manifest themselves clinically by hematuria only, occasionally combined with albuminuria and pain. The parenchymatous or interstitial lesions of sclerosis met with in these cases, as in Bright's disease, present certain peculiarities, for they are in the first place and for a certain time, unilateral, afterwards becoming disseminated in the midst of healthy tissue to a more or less considerable extent. It may be supposed that these lesions, although frequently microscopic, form what may be termed a *partial nephritis,* a form which may give rise to formidable hemorrhage, instances of which have been published under the rubric of "essential hematuria." The nature of the lesions found readily leads one to understand the mechanism of the hemorrhage, which, as in Bright's disease, is dependent upon disturbances of the innervation, blood changes and vascular lesions. The circulation, which may still be carried out effectively under ordinary circumstances in this vascular system so markedly changed, becomes hindered upon the slightest disturbance, from which arise attacks of congestion ending all the more easily in a hemorrhagic raptus the more fragile the vessel walls have become by arteriosclerosis.

These lesions only appear in certain glomerular groups and consequently can only be brought about by some form of chronic intoxication, such as alcohol and infectious diseases, or even simple renal congestion. For this reason the sclerotic lesions will be found associated with other causes of the hematuria, such, for example, as calculus, malignant disease, tuberculosis, movable kidney, cysts, and so forth, and to these causes, in themselves capable of causing a kidney to bleed, the hemorrhagic action of the sclerosis becomes added.

We are led to believe that certain cases of hematuria entirely due to congestion, usually of short duration and easily controlled by medical treatment, may become both tenacious and abundant from the formation of lesions of sclerotic nephritis. It is not necessary that the lesions of sclerosis be very considerable in order to give rise to hematuria, because small lesions apparently of only slight importance may produce a formidable hemorrhage, one of sufficient gravity to place the patient's life in danger.

Clinical examination may occasionally discover the cause of hematuria, when the etiological factor is accompanied by the usual symptoms, but in those cases where hematuria is the only clinical manifestation present, or combined with pain, the diagnosis can only be made by exploratory nephrotomy, so that when dealing with a severe or even alarming hemorrhage produced by a minute renal lesion, the only thing that is left is to treat the hematuria itself. However, it is of great importance to ascertain whether the blood comes from the kidney and if so from which kidney, likewise to discover the condition of the other kidney as near as possible in instances of unilateral hematuria.

Renal hemorrhage is generally intermittent, accompanied by expulsion of cylindrical clots and ureteral colic. There are, however, cases where all these symptoms are wanting.

The bladder may also be the source of hematuria and an excellent method for ascertaining the vesical source of the hemorrhage is to empty the bladder, and, leaving the catheter *in situ,* the bladder is pressed between a finger introduced into the rectum and the hand depressing the hypogastrium. If the bladder is the seat of a hemorrhagiparous disease blood will be seen to escape from the catheter, but when there is a severe hemorrhage from the kidney, as occurs for instance in certain neoplasms, blood may be thrown in such large quantities into the bladder that it flows from the catheter even after evacuation and irrigation of the latter. Cystoscopy is without doubt the best diagnostic means we have at our disposal because it will show the condition of the vesical mucosa and the jet of blood coming from one or both ureters may be seen, at least in a fairly good proportion of cases. The jet of urine should be examined to ascertain whether or not there is a more or less complete retention resulting from compression of the ureter by a pelvic tumor or a pregnant uterus. Under normal conditions the urine makes its exit from the ureter in jets about every twenty or thirty seconds, but in cases of compression, even when slight, but giving rise to hematuria nevertheless, the urine will be seen to dribble away from the ureteral orifice.

Separation of the urine will also give us more complete and precise data. Blood, pus in acute suppurative nephritis or tuberculosis may be found, albumin and casts in chronic nephritides, oxalate of calcium and uric acid in gouty subjects and lithiasis, in the supposedly healthy kidney which does not bleed, one may discover indications of more or less marked lesions, particularly those of chronic nephritis. It is well to have this matter distinctly settled in one's mind, because the kidney primarily healthy, may become involved on account of the bad functioning of its fellow. The study of renal permeability by the use of methylen blue may furnish valuable indications, but in order to obtain the diagnosis of the functional value of each kidney by this test, the urine should be collected separately at the commencement and at the end of elimination.

Too much reliance should not be placed on palpation, because the kidney which does not bleed may be found increased in size and it may also be sensitive to pressure, sometimes more so than its diseased fellow. Pain is almost always met with and consequently has no diagnostic value as to the cause of the hematuria, so much so, that Le Dentu has related five operative cases, the interference being undertaken for pain which was believed to be due to calculi, when in reality he was dealing with chronic nephritis. Some years ago I operated on a man about thirty years of age who presented hematuria coming from the right kidney, the organ being enlarged and tender both spontaneously and by palpation, that a diagnosis of renal calculus was made. Nephrotomy was done, the kidney found considerably enlarged, but only giving evidence of lesions of parenchymatous nephritis. However, the patient made an easy recovery and was relieved of both the pain and the hematuria.

It should also be remembered that a tuberculous kidney may be present in an otherwise apparently perfectly healthy individual and that in movable kidney the hematuria may be due, not to the mobility, but from the presence of calculi, malignant disease, and not infrequently from chronic nephritis. Unilateral lesions of renal sclerosis may be produced in the female by pelvic tumors on the same side, and consequently this etiological factor should always be sought for by a combined vagino-abdominal palpation and last of all exploratory nephrotomy will demonstrate the cause of the hematuria in a large majority of cases where a thorough clinical examination failed to throw any light on the nature of the trouble.

Surgical interference becomes legitimate on account of the nature of the lesions, as well as from the serious prognosis which may rightly be given to hematuria of almost any origin. Then again, very frequently the cause of the hematuria may remain unrecognized, and the operation is carried out simply because the kidney has been bleeding freely for a long time. I believe at the present time that most surgeons agree that interference is proper in cases where the hematuria has been rebellious to all forms of recognized medical treatment, and from its duration and abundance is a danger to the patient's life. I refer here to those cases where clinical examination does not discover any lesion indicating a precise interference.

If we rapidly examine the various causes of hematuria, it will be seen that the principal factor of hemorrhage is congestion of the organ, depending upon a nervous influence occasioned not infrequently by a minute lesion or one in its developmental stage. Thus may be explained the premonitory hematuria which may be separated from the clinical commencement of the disease by a certain number of years. The interference to be complete and result in a permanent cure, should be directed against the congestion, the nervous system and the renal lesion. The unilaterality of the disease is not a condition *sine qua non* of operating, because many clinical facts have demonstrated beyond a doubt the favorable influence that the surgical treatment of one kidney may exercise over the physiological functioning of its fellow. Besides nephrectomy and nephrotomy, other interferences have been undertaken in cases where the lesions were bilateral and the instances recorded by Gerster, Lilienthal and many others, including myself, of operation for nephritis, demonstrates that both kidneys could be operated on in the same séance with a successful outcome.

Before considering nephrotomy, I would like to refer to certain operations which may act favorably in the case of hematuria. Harris collecting 16 cases of renal hematuria of unknown cause, concludes in favor of nephrectomy. This radical operation evidently has the advantage of doing away with both the hematuria and its cause, no matter what this may be, but it can only be undertaken when one is sure that the lesions exist only on one side, and all those experienced in genito-urinary diseases are well aware that this certitude is not infrequently very difficult to acquire. It is true that many eminent surgeons have operated, and the patients have survived and returned to health, but there also exist not a few cases of patients who died on account of the lesions in the opposite kidney, which was considered healthy. Independently of this view point, it is well to preserve all remaining healthy tissue contained in a diseased kidney, and for this very reason I believe that primary nephrectomy at least should be rejected because hemostasis of the bleeding kidney may very frequently be obtained by a conservative operation. I certainly admit that there are cases where nephrectomy is legitimate from the nature of the lesions found, this being especially true when the bleeding arises in a tuberculous or carcinomatous kidney. However, certain surgeons believe that when the neoplasm is small and limited, partial nephrectomy may be undertaken.

Nephrectomy has also been considered the proper treatment for tuberculous infection of the kidney, but on this point I must to a certain extent dissent, because in one case of a young woman about twenty-five years of age, exploratory nephrotomy showed a localized tuberculosis at the lower pole of the kidney, the remaining two-thirds of the organ being quite healthy upon inspection. I resected the lower third of the organ and the patient has gained in weight and remains perfectly well as far as her kidney is concerned. This resection was done about three years ago.

Renal decapsulation has been undertaken for the control of hematuria, and there is no doubt that it may act favorably in certain cases of renal hemorrhage. It acts as a strong derivative on the congestion as well as on the nervous system, and relieves the pressure exercised by the capsule on the distended organ. In cases of chronic nephritis it may cause the lesions to regress, at the same time putting an end to the hematuria. However, decapsulation in itself does not allow one to ascertain the cause of the hematuria unless it be a manifestation of chronic Bright's disease, because there may be hidden lesions within the renal parenchyma which can only be discovered by nephrotomy.

Nephrolysis practiced by Rovsing especially for pain arising in the various nephritides, may favorably influence the hematuria. This operation consisting merely in breaking down adhesions between the kidney and the surrounding structures results in a nervous reaction, which may put an end to the pain and hematuria. Rovsing also believes that it modifies the circulation on account of the anastomosis of the vessels of the capsule and those of the kidney, and thus may make hopeful the cure of the nephritis. If, however, the hematuria is dependent upon some cause other than the nephritis, this operation will only act upon the congestion from the bleeding or the nervous reaction which results from it.

Nephropexy has been successfully employed in movable kidney with hematuria, but in my way of thinking, if this operation is to be a complete one, it should be combined with an exploratory nephrotomy, because it is well known that a movable kidney is very frequently the seat of other lesions, particularly those of chronic nephritis. Simple fixation of the kidney has no control over these, and after operation the hematuria may reappear if the lesion accompanying the nephroptosis is a hemorrhagiparous one. It, however, must be admitted that in cases where the renal bleeding appears solely due to the nephroptosis either from congestion of the organ or retention, fixation of the kidney may result in a cure, perhaps even in a regression of the sclerotic lesions.

Cases, far too numerous to mention, have demonstrated that simple nephrotomy has been alone sufficient to control rebellious hematuria due to calculus, renal tuberculosis, nephritis and so forth. Its hemostatic influence is at the present time admitted by a large number of surgeons, especially in those instances where the operation was undertaken when clinical examination gave no indication as to the cause of the hematuria.

Nephrotomy has the great advantage of preserving an organ which is still partially healthy, and it is a maxim among surgeons generally that every cubic centimeter of healthy, secreting renal tissue should be saved when possible. This operation also allows one to operate upon the kidney which primarily was healthy, if in its turn it should become diseased, or to operate on both kidneys when the hematuria comes from each. In the large majority of cases, this operation will reveal the cause of the bleeding which may then be removed. When the hemorrhage is due to lesions of commencing tuberculosis, nephrotomy may stop the hematuria and consequently may be done in tuberculosis when the condition of the other kidney contraindicates nephrectomy. The same indications exist in cases of malignant renal disease. Nephrotomy may give good results in bleeding from renal cysts, and a polycystic kidney which is believed by many to be often unilateral should be removed, but Albarran has pointed out, and very justly so, that one may find a pseudopolycystic kidney where these degenerative lesions are commencing. It is, however, above all in hematuria due to lithiasis or sclerosis, that nephrotomy has given the most brilliant results, and at the present time a sufficient number of instances can be collected proving that nephrotomy has been followed by a permanent cure.

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BILHARZIA HEMATOBIUM.[1]

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IN 1851 Theodor Bilharz described the blood fluke called Bilharzia hematobium, and to the group of symptoms caused by this fluke, otherwise called Distoma Hematobium, is given the name Bilharziosis.

The few references to it in medical books and journals, would serve to indicate that in this country at least, very few suffer from its presence. The *Reference Hand Book of Medical Sciences*, 1904, states that three cases have been discovered in this country, one at the World's Fair in 1893, one at New Orleans and one in New York City.[1]

J. Gutsch in *London Lancet*, 1899, reports it in a boy, age seventeen, who had lived in South Africa up to two years previous.

C. P. Childs, *British Medical Journal*, 1899, reports a case in a girl, age sixteen, who had lived in Natal. She had hematuria and irritation of the bladder. It was thought that she contracted the disease while bathing in a fresh water pool.

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[1] Read before the Detroit Academy of Medicine, October 23, 1906.

[1] Dr. R. F. O'Neil of Boston recorded a case two years ago, met with in Boston. See Boston Med. and Surg. Journ., October 27, 1904.—The Editor.

Munson, in *British Medical Journal,* reports one case infected in the West Indies and another from Cyprus.

I presume it quite possible that my case is the only one up to date recognized in Michigan, and therefore hope that a somewhat detailed report of it may prove of interest to the Academy.

While the name Bilharzia is of recent origin, not so the Distoma Hematobium itself, for we find it mentioned in the famous Ebers papyrus, discovered at Thebes in 1870 by George Ebers. This papyrus may have been written as late as 1552 B. C., but it is quite probable that it is 7000 years old. To me the description of this great document is one of the most interesting things found in Vol. 45 of *The Journal of the A. M. A.* For our present purpose it is sufficient to know that our little worm has a very notable place in history.

Bilharz in 1851, described it as present in a large number of fellahs and Copts of Egypt. Since then it is known to thrive on the east coast of Africa, Brazil and Arabia, producing endemic hematuria.

Stengel, p. 264, Vol 7, "20th Century Practice," says that it is found in the main trunks and branches of the portal vein, in the splenic-mesenteric and veins of the bladder and rectum.

There is great difference in size between the male and female, the male being from 12 to 14 m.m. long and 1 m.m. wide, while the female is often 20 m.m. long and only .28 m.m. wide. The male wraps his wide body around the narrow female, forming a tube or gynecophore in which the female rests. Both male and female have two mouths or suckers, one at the anterior tip, the other on the ventral surface a short distance back, hence the name distoma.

The ova are small bodies, .04 m.m. wide by .12 m.m. long, and carry a short point or spicule on end or side. They have been found in the lungs, liver, bladder, and urine. Stengel says that neither the parasite nor its ova have been found in the blood stream.

Salinger and Kalteyer state that the ova at birth contain ciliated embryo. On leaving the urethra or uterus, it is carried into water and muddy soil where it seeks its host, usually a mollusk or crustacean. Other writers state that it is found in impure water and may find entrance to the human body either through drinking, or bathing in such water.

An interesting report is given us in *American Med.*, 1905, by Claude A. Smith, Atlanta, Ga., of his studies of the ova. Knowing that the Boers and English from South Africa, comprising the participants in the Boer War spectacle at the St. Louis Fair were to be in Atlanta for three days, and that it was reported that a large number of the inhabitants of South Africa were bearers of the parasite Bilharzia, he went to Capt. Hyndon, who, while sure that none of his troops were diseased, assisted him so that he obtained urine from forty-five of the soldiers who reported that they were perfectly well, but gave a history of past infection. Of the forty-five specimens, in three he found numerous ova and in four a few; blood cells were present in each specimen, and two showed pus cells. No casts were found. He found the spine always at the end, never on the side.

In some the embryo filled the ovum; in others there seemed to be considerable fluid allowing movement to the embryo. Cilia cover the embryo, but so transparent are they that only in profile may they be readily seen. In urine the ova lose their vitality in a week, if kept in a cool place, but in half that time if it is warm, but the general form and appearance remain unchanged for months. When ova are placed in water the larvæ begin to move from side to side, soon the shell breaks and the larvæ move rapidly, changing their shape as they move. The movements are sluggish in low temperature, and in any event the larvæ die after an hour or two.

In other places I find it stated that blood, pus, at times fat, ova and even the parasite itself may be found in the urine, due to ulceration of the mucous membrane of the bladder, thus freeing the parasite and its ova, together with the products of inflammation. Also that while a majority of those affected recover, many die from progressive anemia, nephritis or other constitutional effects, which will occur to anyone as possible.

To the severity of the infection the gravity of the disease seems due. The tendency seems to be toward elimination of the ova; the larvæ probably not entering the human body except through an intermediate host.

The following is taken from my case book: Fred M., age thirty-four, native of Michigan; family and personal history good.

While serving in English army in South Africa, met with slight injury in July, 1902, while riding a horse which was caught in a stampede: in an effort to avoid injury, strained himself and was off duty three days. In the spring of 1903, first noticed bladder trouble, passed small quantities of blood, and he says bloody mucus and pieces of flesh. No pain was experienced at this time. Blood passed from rectum at various times. Patient left northern part of the Transvaal and went to Johannesburg in May, 1903, frequented restaurants, living almost exclusively on frozen beef from Australia. He was taken sick only three days after reaching town. Penis and scrotum became very much swollen, but not painful, and large white swellings appeared on head and arms. These were oval in shape, the larger ones three inches in diameter and raised from skin surface at least an inch. At this time bowels were much constipated. Drugs failed to relieve him for a week. The swellings remained but a few days and the smaller ones but a few hours. I presume that this symptom was only an exaggerated form of hives.

During the past year he has been at home on a farm or engaged in driving a heavy, springless electric truck about Detroit. He has felt well, but on several occasions after heavy lifting or straining, has noticed blood in the urine. September 28, 1904, he stated that of late he has frequently passed a few drops of blood after urination. Has been driving the truck for some time. Now complains of pain over bladder and urinates every hour. Urine acid, normal specific gravity. Pus and blood cells present, also streptococci and short bacilli. With a No. 18 searcher, I carefully explored bladder for stone with negative results, nor could I detect any heat or enlargement in the prostate gland. Oct. 2, temp. 100°; pulse 85; urine less turbid; no pus, but blood and few epithelia from prostate or kidney. Oct. 11, has been in St. Mary's Hospital for a week. Urine, spec. grav. 1024; no blood, albumen present, also a few pus cells. Temperature having been absent for two days, he left the hospital, but now has a temperature of 100°. Oct. 12, feels better; temp. 99°; find a blood clot and red blood cells in urine. Says that for over a year he has occasionally had distress at neck of bladder and passed blood clots. Oct. 17, feels badly. Does not sleep well. Temp. 103.5°. Has moderate degree of soreness over kidneys; no pain on pressure, or enlargement. Returned him to hospital. Ordered hot bath, milk diet. Trional at bedtime; also phenacetine and quinine until temperature becomes lower. At this time my diagnosis was pyelonephritis, excited by becoming chilled and by being shaken up by the truck, and yet I could not dispossess myself of the feeling that his hematuria was due to some blood disease contracted in South Africa. I could never find crystals in the urine, causing me to suspect stone in the kidney or bladder. His urine was examined in the Detroit Clinical Laboratory, with negative results, as far as ova were concerned.

Oct. 18. Temp., A. M., 101.3°; P. M., 99.8°; pulse 88.
Oct. 19. Temp., A. M., 98.8°; P. M., 103.4°; pulse 91.
Oct. 20. Temp., A. M., 99.4°; P. M., 102.6°.

This day I examined urine. Specific grav. 1030, acid; present granular casts, pus cells, small cuboidal epithelia and albumen. With a ⅛ objective I found and pointed out to Dr. Wm. E. Kean, two regular ovoid bodies, yellowish in color, with marked projecting point at one end. There was no mistaking them as ova of some sort, but at that time I did not know what they were, but drew them in my book as parts of the notes on the case.

From this time on there was gradual improvement, and on October 31, his temp. was 98.4°; pulse 70; urine contained few pus cells, but no casts, albumen, nor foreign bodies that I could find. He was discharged, having been in hospital two weeks.

March 19, '05, he reported at my office; urine normal, weight normal, prostate normal. Had had no trouble since seen the year before, and believed himself perfectly well.

At this time no name had been given to the disease other than pyelonephritis and prostatic cystitis, and exposure, and the shaking up that he received on the truck were believed to be the exciting causes of the attack, through which I had the opportunity of watching the patient. My mind had become fixed, however, on these oval bodies seen. About July 25, 1905, on the *Dolphin* en route to Alaska, Dr. Smith was passing the time fingering his typewriter. Looking over his shoulder I said: "What are you doing," and before he replied, I saw before my eyes, drawings of the ova that I had seen the year before. He replied: "I am making a copy of my paper on Bilharzia Hematobium for *American Medicine.*"

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LIPOMA AND LIPO-SARCOMA OF THE KIDNEY.

(From the Pathological Institute of the University of Griefswald, Germany.)

By Dr. CARL HARTWIG.

IN his classical work on tumors, Virchow made a distinction between hyperplastic lipoma and heteroplastic lipoma. Fatty tumors are found far most frequently in those places which physiologically contain more or less fat. They develop from an overgrowth of the pre-existing fatty tissue, and, therefore, are spoken of as hyperplastic lipomata.

On the other hand, the heteroplastic types arise in those regions where there is no pre-existing fatty tissue, or one which predisposes to collections of fat. Virchow assumes that they develop in the same manner as any other fatty tissue, that is to say, by cell overgrowth in the tissue, which is followed by the appearance of fat within the cells.

As a prototype of this group, this same authority describes lipoma of the kidney as a collection of fat usually about the size of a cherry stone, generally located in the cortex of the kidney. These he distinguishes by their location under the tunica albuginea, from lipomata of the capsule which arise from the fat in the latter.

While these so-called true lipomata were formerly very frequently met with accidentally during autopsy, their number has diminished very greatly of late since Grawitz, in 1884, showed that many of these formations at that time termed lipoma, were nothing more than accessory suprarenal bodies. Now, although from this fact, the frequency of true heteroplastic, or more correctly speaking, heterotopic fatty tumors has become less, nevertheless true lipomata, varying in size from a pea to a bean, are not infrequently encountered at autopsy and, although the most minute focus is hardly perceptible macroscopically in the renal cortex, they would be more frequently found if the organ was submitted to a careful microscopical examination. On the other hand, fatty tumors of the kidney, which on account of their size are far more important, are much more infrequent; they may attain a very large size and produce conditions which will cause death. Such a case occurred in 1902, the history and pathologic study of which I here give.

Female, thirty-six years of age, married, but had never been pregnant. Menstruation regular. For the past eight years she had noticed a continuous increase in the size of her abdomen, but had never experienced any pain, when suddenly on July 21, 1902, without any accountable cause, she became seriously ill. The physician, when summoned, found the patient in severe collapse. Examination showed that the uterus was small and freely movable in the small pelvis. He consequently could exclude an extra-uterine pregnancy, on account of his negative findings by a bimanual examination, and also on account of the length of time that the tumor had been present. He made a diagnosis of a neoplasm, probably in the right ovary, which had evidently ruptured. In the morning the patient had leaned very hard over a washtub and it was thought that a blood vessel in the growth had ruptured, resulting in an intra-abdominal hemorrhage. In the afternoon, the patient had another attack of collapse, and was at once admitted into the Women's Clinic, where she was immediately operated on by Dr. Martin.

The neoplasm was brought out of the abdominal incision without the occurrence of much hemorrhage. The growth occupied the entire abdomen and was covered by thickened peritoneum; a portion of the growth reached down into the pelvis. No adhesions exisited between the intestine and the tumor, which was completely imbedded in dense tissue. The growth was gradually isolated, and a pedicle formed which extended towards the region of the right kidney. Some firm tissue was found at the end of the pedicle, which proved to be apparently healthy renal parenchyma. Attempting to diminish the size of a tumor by incision, gave no exit to liquid blood, and at length by these manipulations the kidney was ruptured, giving the impression that the upper part had been turned downwards by the growth. When the tumor mass was lifted out, a long prolongation was found running off from it, which proved to be the ureter. This was clamped and the entire mass of vessels of the hilum were tied off and the renal pelvis exposed. The tumor was then seen to arise from the right kidney. The remainder of the kidney, which represented about three-fourths of the organ, had been torn away from the ureter, so it was decided to remove the renal gland. The entire retroperitoneal space down to the iliac space, was filled with blood and the colon completely separated. The vena cava was seen and the aorta felt. The fibrous wall was then clamped off, and all bleeding vessels seemed to be successfully dealt with, when suddenly from an unintentional traction on the tumor, a vessel ruptured, giving rise to a severe hemorrhage, which was finally controlled by clamping and ligatures. All hemorrhage having been controlled, it was found that the ligatures were in close proxmity to the vena cava. The retroperitoneal space extended above to the liver and below to the iliac space. The peritoneum was then sutured and the abdomen closed. Death from anemia.

Examination of the specimen removed revealed a somewhat oval tumor, the size of an adult's head. In length it measured 23 cm., in breadth 17 cm. and in thickness 16 cm.; its weight was 3500 grs. In the upper portions the tumor was hard in consistency, while the lower part was soft and lobulated, this condition being especially marked on the surface. It was covered with a thin, transparent membrane, which had a reddish aspect on account of the fresh hemorrhage. The yellowish red neoplasm showed through this. At some spots this hue was dark or even a blackish red, due to blood clots, which were found after the membrane had been peeled off, which was accomplished with ease. Connected with one end of the tumor, was found a structure which macroscopically proved to be a portion of the kidney. Its posterior and lower portion was continuous with the membrane covering the growth, while at its upper and outer portion, it was more or less adherent to it. The remaining portion of the kidney was also sent with the specimen. On section the tumor revealed a glistening, yellowish surface, which at some spots showed somewhat darker grayish color, along with transparent portions which radiated into the surrounding structures.

Section of the true neoplasm at once led down to a soft, dark red mass, about the size of a small child's head, which laid between the dome-shaped, flattened growth and the membrane surrounding it, thus giving the entire tumor an undulated appearance. The dark central mass was merely coagulated blood.

The portion of the kidney connected with the growth, and representing about one-third of the organ; can be peeled off from the neoplasm, with the exception of a narrow strand; above and in front it was adherent to the tumor to a somewhat greater extent. It was brownish red, with a smooth surface, upon which a number of nodules were present, varying in size from a millet seed to a cherry stone, and which protruded above the surface of the organ. In color they were yellow and transparent, the larger ones being soft and fluctuating.

Upon section, its surface was yellow, very vascular and smooth. The remaining portion of the kidney which was sent with the specimen, showed a few nodules of the same nature. The renal pelvis was normal, likewise its connections with the ureter, and in no way had any connection with the tumor.

Autopsy performed on July 24 by Prof. Grawitz. A fairly large, strongly built cadaver with a broad thorax and well developed mammae, fairly fat, skin white.

Abdomen flat; skin white without striae; in the median line an abdominal incision about 25 cm. in length closed with sutures, the edges of the wound showing no reaction. Upon opening the abdomen, the great omentum was adherent in several places to the parietal peritoneum over the line of incision, and its surrounding was grayish red and smooth. The peritoneum showed its normal glistening appearance everywhere; about 50 to 60 ccm. of liquid blood in the pelvis. The position of the diaphragm cannot be determined, because the liver and spleen are completely imbedded in very thick fibrous adhesions, so that the hand cannot be made to reach the diaphragm. The heart was fully the size of a woman's fist. Outside there was a layer of shiny, light yellow fat, the pericardium was white. The extreme paleness of the muscle was noticeable. The cardiac cavities contained a little watery blood, which had only slightly coagulated. Valves normal. The aortic and pulmonary valves were capable of closing, although delicate in structure. The left ventricle was from 2 to

2½ cm. in thickness, the right from 0.4 to 1 cm. in thickness, pale and reddish gray. Both lungs were soft, crepitant and contained little blood. Bronchial mucosa light red. Arteries and veins normal.

Examination of the brain showed a marked pallor of all the structures of the cerebrum and cerebellum, the ganglions, the pons and the prolongation of the cord, without any pathologic change at the base.

On inspection of the abdominal cavity, a bluish red color of the peritoneum was noticeable, which extended from the region of the right suprarenal body down to the pelvis and from the mesentery of the coecum and neighboring ileum, as well as the upper portion of the jejunum extending over the median line towards the left. The peritoneum was perfectly smooth with the exception of a few small blood clots on the surface. The bloody contents in the pelvis could not be obtained on account of the presence of numerous tough adhesions extending between the uterus and rectum, as well as between the tubes, rectum and bladder, so that no collecting instrument could be inserted between these bands. The peritoneum covering the rectum was bluish black at the level of the promontary, but smooth and glossy, while further down in the pelvis it was grayish white and friable.

After removing several sütures, the large wound cavity was reached, including the right renal region and ureter; the wound cavity was bounded above by the right suprarenal body, and the lower surface of the liver; to the left toward the spine, by the vena cava to the extent of 15 cm.; below by the subserous tissue at the entrance of the pelvis, while on the right and externally by the retroperitoneal tissue of the abdominal wall. The vena cava and aorta were opened in situ and the ligatured renal vein and artery were traced up with the sound as far as the point of ligature. The wall of the vein was somewhat rough externally, but the tunica media and intima were quite delicate and intact.

The left kidney was somewhat smaller than expected, but it was, however, normal in size. Its surface was smooth, but the cortex and medullary substance were very anemic; the ureter was normal, but in its pelvic portion somewhat crooked. Otherwise nothing else was found in the parenchyma, fat capsule, calices, pelvis and ureter.

The bladder was large and its inner surface white. Uterus not enlarged and of the virginal type. Its mucous membrane was light yellow and posteriorally it presented adhesions with the rectum and to the twisted tubes which were bound down to the fundus. The abdominal end of the right tube was completely occluded. The abdominal end of the left tube, was also obliterated to a certain extent, and both tubes were somewhat distended. On incision, a tarry dark red blood was removed. In the left ovary there was a large corpus luteum verum and corpora nigra. The right ovary was small. Rectal mucous membrane grayish white and delicate in structure.

The spleen was removed with difficulty. Its capsule showed, besides a diffuse fibrous thickening, a bony, callous mass, lenticular in shape, and from 2 to 3 cm. in diameter at its thickest portion, and appeared as if pressed into the splenic tissue. The parenchyma was dark red and hard. The organ measured 13:8:3. Stomach, duodenum, intestine and bile tract normal.

The liver was covered by regular fibrous thickening so that its capsule was no longer transparent. The diaphragm cannot be separated from the left lobe, while in the right lobe of the organ a cystic sac the size of a silver dollar was found and surrounded completely by a depression. On section, the center of the sac represented a glossy mass, while its periphery was represented by a yellowish white, soft mass. A membrane was distinctly visible at the periphery. The liver measurements were 28:17:8. On section the surface was smooth and bright, and of a light brownish red color. Little blood flowed from its vessels.

Pathological diagnosis. Extirpated liposarcoma of the right kidney. Intra-abdominal and retroperitoneal hemorrhage. Chronic adhesive perimetritis, perisalpingitis and perioorphritis. Corpus luteum of the left ovary, double hematosalpinx with occlusion of the abdominal portion of the tubes. Chronic fibrous perihepatitis. Encapsulated echinococcus of the right lobe of the liver. Fibrous perisplenitis. Hepatic, splenic, renal and cerebral anemia.

Microscopical examination. Examination of the fresh sections of the neoplasm gave the following results. Sections of the larger part of the growth consisted largely of pure fatty tissue other than those cellular portions found in the growth, and which were macroscopically noticeable on account of their dark color. These cellular foci contain numerous spindle cells along with round cells and fat cells.

The sections were hardened in alcohol and stained with hematoxilin, and revealed similar conditions. Macroscopical sections through the small nodules, show light transparent and dark colored areas. Under a low power, the greater portion of the field was occupied by a loose tissue from which the fat had been extracted by the alcohol. There was a very slight amount of tissue in the intermediate substance. The darker portions which were macroscopically visible, appeared as rounded arteries with a central lumen lying closely together. These arteries were concentric, running across the field both diagonally and longitudinally and surrounded by cellular tissue. At every point in the field, connective tissue strands could be seen without any arrangement around the arteries which was absolutely lacking. The line of demarcation between the neoplastic and renal tissue was fairly distinct; the renal parenchyma did not appear pathologically changed.

Under a high power it became evident that the tissue arranged concentrically around the blood vessels consisted of spindle cells and thread-like bodies, and also that some of the connective tissue strands protruded into the renal parenchyma.

Stained sections of the principal neoplasm showed fatty tissue with its fat removed by alcohol, with a very slight amount of intermediate tissue substance. Vessels were visible at only very few points, and were surrounded by cellular tissue, but they were not nearly so well developed as in the smaller neoplastic nodes. Under a high power the principal growth represented the same histological picture as in the smaller nodules. Without any doubt this case represents a lipoma undergoing sarcomatous transformation.

To pass judgment on this case is by no means a simple matter. Since the microscopical examination shows that the growth was in no way a simple lipoma, but in reality a lipo-sarcoma, it must at first be determined whether the small neoplastic nodules are lipomata, which would be the same as the benign heterotopic lipoma referred to in the commencement of this paper, or whether they should be considered as metastases from the principal growth. Secondly, it must also be demonstrated from what matrix the large growth was derived.

Having carefully examined the collection of specimens in the Pathological Institute of Griefswald, I have microscopic specimens of purely cortical multiple renal lipomata. They can be distinctly distinguished from the microscopic appearances found in the case here reported, in that they represent the characteristic stationary lipoma, composed of large fat cells. The growth looks as if deposited in the normal renal cortex, so that everywhere the urinary tubules are inclosed in, or surrounded by the fat tissue, whereas, over the normal cortex the renal capsule regularly covers the renal parenchyma and the lipoma.

The small nodules found in the case here reported, show that only exceptionally does the fatty tissue directly surround the urinary canals; usually a narrow zone of sarcoma cell tissue, measuring 1 mm. or more, lies between the central tumor nodules and the renal parenchyma. The cells of this sarcomatous tissue are of the round and spindle cell variety, and resemble the larger cells which are found in fatty tissue, becoming atrophic, or in that which is about to regenerate. In this way the malignant character is apparent at many points in the sections, the separate normal glomeruli grow through the tumor cells and become disconnected; at other places the glomeruli shrink, and also grow more or less exuberantly. Well preserved urinary canals are also met with, surrounded by the tumor cells in the neighborhood of the kidney, so that one may conclude with certainty that these small nodules were about to take on rapid growth towards the renal tissue. In the centers of the growth, all sections show pure sarcoma cell areas, especially such as those which have been described in the form of spindle cell strands, contrically arranged around the smallest arteries. These are surrounded by large and well developed fat cells, while the taking up of fat is going on in the periphery, that is to say the metaplasia of tumor cells and, besides the above mentioned round cells, young fat cells can also be seen.

From this, one may draw the conclusion that the smaller nodules are by no means congenital lipoma, but represent metastases from the lipo-sarcoma.

The second question pertains to the point of origin of the principal neoplasms. It is quite clear that the perirenal fat cannot be taken into consideration on account of the microscopical description. On the other hand, the fat tissue in the renal pelvis is important, since the growth directly extends into the pelvis. The aspect of such tumors arising from the renal pelvis after further growth is shown by the following specimen, which I examined, and has already been described by Bartsch in his dissertation published in 1902. The neoplasm, together with the kidney, is surrounded by a common capsule, and in spite of the size of the growth, the specimen has retained the shape of a kidney. Like in hydronephrosis, the renal parenchyma is first destroyed by pressure atrophy at its convexity, and forms an envelope which becomes thinner and thinner, until at length it is with difficulty that the fibrous capsule can be distinguished. Now, the appearance of the case here reported is very different. A large portion of the tumor, which was torn away at the operation, shows that this had grown out of the kidney, and only where it passes over to the kidney can a similar condition of enveloping from the renal capsule and atrophy of the parenchyma be found, as is seen when the case is one of a lipoma of the renal pelvis.

The fact that the tumor is not a benign lipoma, makes it difficult to come to any exact conclusion, the growth merely exercising pressure on the neighboring tissues, so that the possibility of a lipo-sarcoma originating in the fat tissue of the hilum, cannot be excluded absolutely, because, instead of filling up the pelvis, it might possibly grow directly through the renal parenchyma, extend outward through it, and then expand into an abnormally large tumor over the external aspect of the kidney. Much more probable, however, is the assumption that the origin should be sought for in aborrent cortex fat tissue nodules. By continued growth, these would be apt to protrude out of the kidney parenchyma and by extension outwardly and inwardly, would give rise to the form and conditions of the renal pelvis as present in the case here reported.

There are several instances recorded in literature which I would like to briefly consider, and I will first refer to two cases which were examined in the Pathological Institute recently and, according to the finding, undoubtedly originated from the fat tissue of the renal pelvis. I have already referred to one, that described by Bartsch. The growth was removed at operation from a woman thirty years of age, who had noticed its development for six years, from an increase in size of the abdomen. She had always felt well until six weeks before the operation, at which time she began to complain of pain. Upon opening the abdomen a tumor, round in shape and the size of a child's head was removed, its exact measurements being 23 cm. in length, 12 cm. in thickness and weighed 2250 grams. The surface was covered with the fibrous capsule, and the growth retained the shape of the kidney; its surface was generally smooth, although at some spots it appeared slightly lobulated. About three-fourths of the specimen consists of neoplastic substance, the remaining one-fourth being represented by renal tissue. The color of the tumor is in general bluish red intermingled with areas of bluish black. The renal pelvis is present at one end of the tumor and surrounded by normal renal parenchyma. Another yellowish nodule arises from the renal pelvis.

Section of the growth shows that one-half of it is smooth, only slightly vascular and yellow in color, while the other half appears irregular and interwoven with numerous vessels of various dimensions and gives a general yellow appearance, although grayish red areas are also to be seen.

The yellow portions consist of fat tissue, while the grayish red areas are composed of spindle cells with elongated nuclei. Beside there are some round cells and fatty tissue cells.

The appearance of the hardened and stained sections is quite similar. The spindle cells surrounding the vessels have threadlike nuclei, for which reason they are referred to in the notes as unstriped muscle fiber. At some places they resemble a uterine myoma. The line of demarcation between the tumor and the well preserved renal parenchyma is represented by a zone of fibrous tissue. The fact that the growths do not extend into the renal parenchyma excludes any question of a malignant character of the tumor, whereas in the case which I have reported, where the growth extends directly into the renal parenchyma, its malignant character at once becomes evident.

The urinary canals give evidence of little change, which, together with the lack of interstitial growth, shows that the progress of the tumor was extremely slow.

The second case which I will refer to, is one of myxoma of the kidney, and which was described by Schluter in his dissertation. The specimen was obtained from a fifty year old male, who died of chronic renal disease. The dimensions of the left kidney are 9:7:4. The surface was smooth, but showed several irregular elevations and several pea-sized cysts. Upon section the following condition of affairs was ascertained. The true renal parenchyma formed an external capsule measuring from 1 to 1½ cm. in thickness, light red in color, while the medullary substance could not be distinctly distinguished from the cortex. Upon cross section, a mass was found protruding and surrounded by this capsule; it consisted of thick, yellow transparent mucous tissue, containing tissue strands. Macroscopically it gave the impression of a myxoma, which diagnosis was verified by microscopic examination. Attached to the growth and partially surrounded by it, was a ramified system of enlarged calices, which opened into the dilated renal pelvis. Thus the description shows that one was dealing with a tumor originating from the fat tissue of the renal pelvis, and whose histological make-up was that of a myxoma.

Alsberg has recorded another case where the growth did not originate from the fatty tissue of the renal pelvis, and consequently is entirely different from the former. A female, forty years of age, had suffered with inflammation of the intestine 10 years previously, since which time she complained of pain in the abdomen. Examination showed a large tumor on the right side and the diagnosis of a malignant renal neoplasm was made.

The growth was removed by operation and included the kidney which was 13 cm. in length, 8 cm. in thickness and 10 cm. in width, and was surrounded by a firm tissue envelope. Its surface was smooth, with the exception of a row of projecting yellow nodules. On section there was no definite outline of the kidney, while the renal parenchyma was penetrated by the neoplastic nodules; these were yellowish in color and varied in size from a millet seed to a walnut. The nodules were sharply separated from the renal tissue and were circular in shape. Macroscopically the renal parenchyma was not much changed, while the renal pelvis was normal.

Microscopical examination showed that the tumors consisted of pure fat tissue, while in others strands of fatty tissue were found. The surrounding renal parenchyma was partially normal, partially undergoing tissue degeneration. The areas surrounding the lipoma nodules contained well developed strands of tissue composed of spindle cells of varying dimensions and which resembled sarcoma; there was also a very marked development of blood vessels. In this case, therefore, lipoma nodules had developed in the cortex.

There is a great difference of opinion relative to the origin of lipoma of the kidney. In Virchow's theory already alluded to, it is supposed that these fatty growths are derived from cells which have undergone a primary overgrowth, and later on have taken up fat, and this teaching is still adhered to by Benecke and Alsberg, who, basing themselves on their observations, claim that following the overgrowth, metaplastic fat tissue forms.

Beer takes a similar stand. He explains the transition of the renal tissue into fatty tissue as follows: the former first undergoes an overgrowth, and later on fatty degeneration of the cells takes place.

Grawitz upholds an entirely different opinion. He believes that the heteroplastic lipoma of Virchow originates in the same fashion as strumae aberratae, which theory seems reasonable on account of the location, the condition of the surrounding renal parenchyma, and the capsule which is similar in both. He believes that either only portions of the fat capsule penetrate into the renal cortex during the embryonal period, or aborrent suprarenal body germs undergo overgrowth in portions of the fat capsule. The continuation of the growth, he believes occurs from neoformed cells from the aborrent germs, which transform into lipoma cells by the addition of fat.

A case has been described by Horn which would seem to strengthen this theory. Microscopical examination of a nodule situated under the fibrous capsule of the kidney, showed by a low power that the neoplastic tissue was largely formed from true fatty tissue.

With a higher power, rows of fairly large polygonal epithelium could be seen lying in a large mesh tissue stroma. These epithelial bands are principally found near the fibrous capsule, while at other places they are wanting, or nearly so. The nodule superficially appearing as a lipoma is explained in this way; the fat tissue of the capsule reached the renal cortex along with an aborrent suprarenal body germ and had gradually grown over the suprarenal body tissue.

Selter also considers most lipomata as dispersed particles of the capsula adiposa, but he has never been able to observe the transition of this tissue into fatty tissue.

Manasse also asserts that the fatty tissue of the capsula adiposa is carried into the renal cortex, and gives as a reason for this theory, that very frequently small fat lobules in the renal cortex are observed in close continuity with the capsula adiposa.

Lubarsch has observed cases where fat lobules were located in the cortex of the kidney which became loosened by washing; in another instance, the fat tissue remained intimately adherent to the surface of the kidney, and it was easily demonstrated how it had grown through the tissue capsule on to the surface of the kidney.

Ulrich upholds a teaching entirely different from those already given. He bases his opinion on the results obtained in the examination of five cases, and says that the so-called true lipomata of the kidney are not composed of fat tissue, there is no neoformation, but that in reality degenerated fatty renal epithelium gives rise to the appearance of a lipoma.

So far, I only considered lipomata located in the cortex of the kidney and termed heteroplastic by Virchow.

The other type are those which I referred to at the commencement of this paper, namely the hyperplastic, which arise partly from the capsula adiposa and partly from the fatty tissue of the renal pelvis. By consulting the literature, it will be seen that they are far more frequent than those arising in the renal cortex, and are to be distinguished from the latter by their large size. Among the cases recorded by Leyden, he mentions one observed by Waldeyer, the growth being a lipo-sarcoma of the capsula adiposa, accompanied with fatty degeneration of the cortex, the whole mass weighing 63 lbs.

Another case which also originated in the capsula adiposa, weighed 41 lbs., the kidney still being perfectly normal.

I will refer in detail to a case published by Godard. The subject had committed suicide, but during life had never complained of any symptoms. Post mortem showed that the area of the left kidney was occupied by a growth, which was formed above and externally by the gland, below and internally by a large amount of fat. The neoplasm was oval in shape and measured 198 mm. in length and 108 mm. in its antero-posterior line, and was surrounded by firm tissue. Upon section, a large amount of white purulent fluid escaped from the greatly dilated renal pelvis. The renal tissue was almost completely destroyed, excepting for a few pyramids. An oxalate of calcium calculus, about the size of an almond, was found in the renal pelvis. The ureter was markedly contracted.

The opinion of authors still differs as to the origin of these tumors. Todd and Bowmann assume that in those cases, where, for instance, atrophy of the kidney occurred from pyelitis, and in which a large increase of fat took place in the atrophic kidney surrounded by fatty tissue, the latter would finally involve the kidney itself.

According to Beer, this type of lipoma originates from metaplasia, just as those arising in the renal cortex, the metaplasia being the result of a former inflammation of the renal parenchyma.

His theory is supported by Ebstein, who is also of the opinion that renal tissue can be directly converted into fatty tissue, and he publishes the following case upon which he bases this theory. The patient was an elderly female who suddenly died. The right kidney was normal, the left being enlarged to more than twice its normal size. The excessive capsula adiposa was greatly in contrast to that on the right side where it was lacking. The remarkable fact, however, was that the entire kidney was composed of fat tissue without any evidence of the presence of renal tissue. The cortex was distinctly separated from the pyramids, the latter being sharply defined from each other. The capsule was adherent to the entire mass of fat. There was a small amount of blood in the renal pelvis, while the ureter was normal.

Rokitanski and Perls assume that if a profuse penetration of fat takes place into the hilum of the kidney, a secondary degeneration of the kidney results, which forms a soft, fat lobule. Whether atrophy of the kidney should be considered as a result of the increase in fatty tissue is as yet still doubtful.

In almost all cases of renal atrophy and increase of fat in the kidney, calculous formation has been met with in the renal pelvis, a fact which led Selter to accept this condition as a cause of the renal atrophy, and to consider the formation of fat as merely a secondary occurrence.

Selter asserts that in 9 out of 10 cases of so-called lipomatosis of the kidney, calculi were found in the hilum. Among several of the cases reported by Leyden, calculous formations were present in the renal pelvis.

Basing himself on his personal observations, Selter comes to the following conclusions, which, at the present time, are agreed in by most authorities. (1) All known cases of fatty transformation of the kidney show that there is an overgrowth of fat and not the development of a fatty tumor. (2) This arises from the surrounding capsule, more especially from the small, fat clusters in the hilum. (3) True lipoma only occurs in the renal cortex in the form of small nodules about the size of a cherry stone. (4) These are of a heteroplastic nature and are not derived from the renal tissue, but from aborrent fat tissue germs which become enclosed, either during the development or the growth of the organ. (5) In none of the cases observed up to the present, have these tumors led to the destruction of the surrounding renal parenchyma.

In closing, I would refer once more to the question of the origin of the neoplasm reported at the beginning of this paper, and aside from its relations to the kidney, its very great difference from recorded cases, would seem to be against its origin from fatty tissue of the hilum and in favor of a lipoma nodule in the cortex. Therefore, if this is admitted, this case would be the only recorded example of its kind.

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A CASE OF ESSENTIAL UNILATERAL HEMATURIA. NEPHRECTOMY, RECOVERY.[1]

By JOHN W. KEEFE, M. D., Providence.

W. A. P. Farmer. Aged thirty-eight years. Entered the Rhode Island Hospital, February 4, 1906. Careful inquiry was made with reference to the family history, and it was found that none of the family or ancestors have been bleeders.

The patient was well until six years ago, when he says he caught cold and had an attack of very frequent and painful micturition, with hematuria. This attack lasted for two months, and the patient was able to do very little work. He was treated with irrigation of the bladder, etc., and made an apparently good recovery. About five years ago he was kicked in the right testicle. A hydrocele developed which was tapped several times. There has been no reaccumulation of fluid during the past two years. Since the accident he has had a hard mass in the right testicle about the size of a small egg, which is not tender or painful. About three years ago he noticed a little blood in his urine which appeared as small streaks. The blood has increased in amount until the present time, when he passes several ounces daily. The blood passed is at times bright red or on other occasions it is clotted.

Physical examination. Man of large frame, pale, sallow complexion, lips blue. Has lost thirty-five pounds in weight during the last year. On the right side of the scrotum is felt a firm, hard mass, the size of an egg. This mass is smooth, not tender, and is not adherent to the skin. It does not transmit light.

Urine. Red color. Sp. gr., 1029. Alkaline. Large trace of albumen. Considerable sediment. Microscopical examination shows a large quantity of blood.

February 6. Cystoscopy. Air inflation of the bladder. The mouth of the left ureter apeared red, swollen and pouting.

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[1] Read at the N. E. Urological Society, Hartford, October 22, 1906.

The remainder of the bladder wall was apparently normal. The left ureter was catheterized and a specimen of urine obtained.

This urine upon examination was light red in color. Sp. gr., 1033. Acid reaction. Large trace of albumen. There was one and one-half inches of red flocculent precipitate. Microscopical examination shows numerous blood corpuscles, calcium oxalate crystals. No casts.

February 8. The X-ray shows nothing abnormal. The quantity of blood in the urine remains the same. Temperature 98°4. Pulse 88. The patient complains of a dull, aching pain over region of the left kidney.

February 10. Operation Nephrectomy. Gas-ether. Incision, linear, four to five inches long, three inches to the left of the spinous processes, just below the twelfth rib. The left kidney was brought up into the wound with difficulty, and was lacerated somewhat in so doing. The kidney was palpated, incised and probed carefully for stones, but none were found. The kidney appeared normal in size and shape.

The renal vessels and ureter were clamped, and the kidney removed. The vessels and ureter were ligated separately. Deep suture of number one chromic gut in the muscles and lumbar fascia. Number one plain gut in subcutaneous tissue. Subcuticular suture of fine silver wire.

February 12. The second day after operation the amount of urine passed was equal in amount to that passed previous to the operation. Urine, light amber. Sp. gr., 1023. Acid. Slight trace of albumen. Very cloudy. Microscopical examination. Bacteria. Uric acid crystals. Numerous red blood cells, few leucocytes. Temperature 99°4. Pulse 80.

February 15. General condition good. Temperature 100, pulse 100. Urine light amber. Sp. gr., 1012. Acid. Slight trace of albumen. Faint flocculent cloud. Microscopical examination. Mucous shreds. Few round and squamous cells. Occasional leucocyte. Rarely red blood cells.

February 19. Silver sutures removed, wound healed. No red blood corpuscles were found to-day upon examination of the urine.

The patient left the hospital three weeks after the operation, and up to the present time no blood has been found in the urine since the ninth day following the operation. Two weeks after returning home, he had some pus discharge from the wound. The sinus left healed in a few weeks.

Report of Dr. Fulton, Pathologist at the Rhode Island Hospital. Specimen consists of the greater portion of one kidney. It measures 12x6x3 cm., and has been divided at about its center in its longest diameter. From one side of this there is a cone-shaped piece of tissue absent, measuring 6 cm. in breadth at the cortex, and 2 cm. in breadth at the pelvis. Externally the surface of this organ is partially covered by a thin, whitish capsule which can easily be scraped away, leaving behind a smooth, regular surface. On section the cortex has a very pale brown color. It measures 4 to 6 mm. in thickness, the glomeruli and striations are very clearly seen. The pyramids are a trifle darker in color and clearly marked off from the cortex and at their tips, as they open into the pelvis are smooth, even, of the same homogeneous color. The blood vessels as they are traced into the kidney substance, show nothing remarkable. The pelvis so far as it is seen, is smooth and even, but scattered here and there throughout its lining, there are several little reddish, injected areas, rather roundish, but for the most part irregular in outline. These average 2 to 3 mm. in diameter and generally have a bright red color.

Microscopical examination. For a great part the microscopical structure of the kidney is not remarkable. The epithelium of the smaller tubules is perhaps more markedly differentiated from that of the convoluted tubules than is usual. Section from beneath the cortex in one of the sections shows a narrow zone where the vessels are injected, and there is some extravasation of blood into the kidney tissue, and where some of the kidney tubules are filled with blood. The cause of this condition is not evident at this point. In one of the sections taken from the pelvis, there are seen a few small areas of extravasation of blood into the tissues of the pelvis. Otherwise the kidney is not remarkable.

On August 15, 1906, I saw the patient and learned that he was able to work every day and weighed one hundred and eighty-five pounds, which is more than he had ever weighed before. He has not passed bloody urine and has no pain or discomfort anywhere. The amount of urine passed varies within normal limits. He says he is as well as he ever was.

Hofbauer mentions a case of essential unilateral hematuria in a girl thirteen years of age, somewhat similar to the case here reported. An examination of the urine showed nothing abnormal except the presence of blood. Cystoscopy showed the bladder normal. Blood was seen to flow from the left ureter, while clear urine came from the right. Operation. Kidney withdrawn for inspection, one of the larger blood vessels was lacerated, necessitating removal of the kidney. Microscopically, there was revealed a chronic glomerular nephritis. The hemorrhage ceased and recovery followed. The amount of urine a few days after operation exceeded the amount passed before operation.

VESICAL CALCULUS.[1]

By GEORGE KNOWLES SWINBURNE, M. D., New York.

WHEN Dr. Ayres asked me to read a short paper on this subject, he did not tell me what ground he wished me to cover. Three or four divisions might be made: I. How they get there; II. How to find them when they are there; III. How to get them out; IV. How to keep them from forming.

I.—How they get there: though interesting, this division is largely theoretical, and as my views are mostly based on my reading rather than personal observation, they are of little interest to you.

II.—How to find them, when they are there. I shall dwell a moment on this division, though it may be superfluous before this body, because I have been startled in some instances at the length of time a patient had been treated for bladder trouble without its ever occurring to the physician to make a search for stone. Foremost for purposes of diagnosis, is the searcher. More often the stone is very readily discovered with the aid of this instrument, though sometimes it may elude the skillful manipulation of the most experienced; (2) the evacuator may be of assistance in finding and even removing a stone that has escaped the searcher; (3) the cystoscope has proved of the greatest value as an aid to diagnosis. It gives us more information than the mere presence of stone; by its aid we may also learn the condition of the bladder wall, the size, number, perhaps the composition of the stones, whether they are encysted, adherent, etc. Therefore, it is of value in aiding us to form an opinion as to the best operative procedure in a given case.

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[1] Read at Urological Association, N. Y. Branch, October 24, 1906.

(4) The X-ray. This, though of so much value in the case of kidney and ureteral stone, has been, I fancy, of but little real value in vesical calculus. Many pictures of bladder stone have been made, but I do not know of any instance where it could have been the sole means of determining its presence. I know of one case of a large uric acid stone, easily found with the searcher, where the shadowgraph gave no sign.

III.—How to get them out. This is the rock on which we split. I think the preponderance of opinion among surgeons, whose work is largely or entirely confined to genito-urinary diseases, is in favor of the crushing operation in properly selected cases, while it is the practice of American surgeons in general to do the suprapubic operation almost exclusively. This is due to the fact that the majority are utterly unfamiliar with the crushing operation, while the majority of those who are familiar with it have not trained themselves to perform it, and look upon the cutting operation as easier and safer. Yet it seems to me that they do not take into account the marked difference in the length of time of convalescence between the two operations, which is often of great importance to the patient. After the crushing operation, the patient seldom need be detained longer than two days, while with the cutting operation—if performed, when possible, under the ideal condition of completely closing the bladder wound—I doubt whether it is safe to allow the patient to go about under three weeks, and, as ordinarily performed, six weeks is the shortest time to elapse before he can get about.

As to recurrence of stone after removal, I suppose it would be folly to deny that the conditions are such that this is more likely to happen after crushing, but I maintain that with an intelligent patient, recurrence due to particles left behind can be easily guarded against by intelligent use of the cystoscope and evacuator used at a moderate interval of time after operation. Equally it cannot be claimed that recurrence is absent after cutting. Some patients form stone so readily that cutting would seem to be best avoided, if possible. I know of one case where suprapubic cystotomy was performed on a patient and repeated a year later by the same surgeon, and I have often wondered what the effect would be should the patient require a third and even fourth operation, quite possible in such a case.

As to accidents during litholapaxy, such as injury to the bladder wall, or breaking of the beak of the lithotrite and losing it in the bladder cavity. The former is avoided by careful attention to details; the latter, which has occurred and may occur perhaps to almost any instrument, simply calls for the suprapubic operation. And when patients are operated upon by litholapaxy under general anesthesia, it should be the practice of the surgeon to have the patient shaved and ready, should occasion arise, to make it necessary to have recourse to the suprapubic route.

As to anesthesia. The majority of cases are preferably done under general anesthesia, and I prefer a trained anesthetist. Some cases where the urethra is tolerant to instrumentation can be operated upon under cocaine, and even without that, as Dr. Muren of Brooklyn has shown us.

I have performed litholapaxy eleven times and suprapubic cystotomy for stone, but once. This with one other case which I was obliged to send to a hospital for cystotomy (at that time not having a hospital at my command), makes two cases only out of thirteen, in which the suprapubic route seemed the preferable method, and makes a very large proportion of cases favorable for litholapaxy.

Stone in women removed by litholapaxy, I have no real experience with; in a case reported by me a year ago,[2] a large phosphatic concretion around a hair pin, where the calculus with its nucleus was wedged above the symphysis, and the bladder would hold only an ounce of fluid, was not a real litholapaxy. The stone was readily caught between the jaws of the lithotrite and reduced to powder, and the hair pin removed by dilating the urethra with the fingers, catching the points which first presented, and by bimanual manipulation bringing them into the urethra and removing them with an artery clamp.

IV.—How to keep them from forming. This division I shall have to leave to those who are better acquainted with the processes of metabolism. There are those who claim to be able to prevent recurrence after calculous material has been removed.

64 East 56th Street.

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[2] American Medicine, March 10, 1906, pp. 354-357.

DISCUSSION OF DR. SWINBURNE'S PAPER.

Dr. G. Morgan Muren, Brooklyn: I am particularly interested in litholapaxy and have enjoyed hearing Dr. Swinburne's paper very much. Until three years ago I had done four or five litholapaxies under general anesthesia. The first case of interest was referred to me by Dr. Reeve of Brooklyn. He was fifty-four years old. He was operated in the hospital with ether anesthesia. Later I discovered that all fragments had not been removed. It was then that it occurred to me to attempt the operation without either general or local anesthesia. I finally removed all fragments in this case in eight or ten sittings. The patient was a theatrical carpenter, came to my office in the morning, and was always able to attend to his work during the afternoon and evening of the days when the crushings were done. I have done fifteen other cases without any anesthetic, and the main complaint of the patients has been during the operation of the evacuating apparatus. These sixteen cases were reported last week before the Brooklyn Medical Society, in a paper that I had expected to read at the last annual meeting of this association. Almost any number of crushings may be done on the average patient, but this is not true of the cutting operation, if we consider the undesirable scar tissue that would certainly be a menace to an elderly man, with an already contracted bladder. A case that I saw during the past summer with Dr. Pyburn of Brooklyn, is a good example. The patient was seventy-four years old. Both testicles had been removed six years previously for prostatic hypertrophy. His symptoms were relieved, until about a year ago, when symptoms of obstruction again appearing, the same surgeon opened his bladder, with the idea of doing a suprapubic prostatectomy. The prostate was found in good condition and was not removed. A large calculus, whose presence had not previously been suspected, was removed, and the bladder finally closed after a long period. The bladder was much contracted when I saw him, its capacity being only about 100 c.c. I was asked to see him, as another stone had formed. I believe another suprapubic cystotomy in this case would have still further impaired his bladder capacity. In discussing my paper of a week ago, and a paper in which I reported the first two cases before the Long Island Medical Society, two years ago, all the general surgeons while admitting that they had no experience with it, condemned litholapaxy as an unsafe and unsurgical procedure. This was immediately after I had quoted overwhelming statistics in favor of the crushing operation. This is but one of the subjects on which the general surgeon might learn something from his brethren in the surgical specialties.

Dr. Fred C. Valentine: The brilliant paper we have just heard, and Dr. Muren's discussion, give opportunity to present my predilection of litholapaxy, in suitable cases. I confess, however, that I would not think of crushing a stone otherwise than with the patient in bed for forty-eight hours. It can easily be conceived that a number of patients may be successfully treated without confinement, yet no one can foretell the safety of the procedure in any given case. The large number of litholapaxies I have seen the great Guyon perform, were the inspiration to me, as to his other followers. It is true that few can expect to attain his marvellous skill; yet the choice between crushing and cutting is too evident for discussion. It is safe to say that any of us, if so unfortunate as to have a stone in the bladder, would prefer the two days' confinement to the dangers of suprapubic or perineal cystotomy with at least two weeks in bed, if the immediate results are ideal. But the ideal results from the cutting operation necessarily cannot be expected as often as from crushing a stone. It is a natural expectation that Dr.

Swineburne's paper will lead to a revival of litholapaxy in our country, where it has, for no evident reason, been almost entirely supplanted by cystotomy. I concede that cutting for stone is the more brilliant operation; but from the patient's viewpoint, crushing is by far the preferable procedure.

Dr. **Follen Cabot**, New York: The reason the general surgeon will not do the operation is because it is a difficult one. It is very difficult to grasp small stones. I had a case where the stone was the size of two beans. After introducing my cystoscope, I broke it in two with my forceps, and the patient passed it out. Regarding prostatic pouch, I had a case where there was a stone in this pouch the size of a walnut. It could not be reached or seen, and a perineal operation failed to show it. The patient later still had his symptoms. I had found evidences of a deposit in the bladder, and also a diverticulum. I made a diagnosis of these deposits by the phonophore. An operation was done suprapubically, and the stone found and removed. English surgeons in India have reported 800 or more crushing operations. They consider cutting for a stone malpractice. I recently saw reported a case where a man's bladder was torn and allowed to go two or three days, and he finally died of ruptured bladder. Be sure not to grasp the bladder wall before crushing. Lilienthal says he once removed twelve stones suprapubically from the bladder. He does not crush. In small children, where it is hard to get into the bladder, I have used the phonophore without the cystoscope as a diagnostic aid.

Dr. **Wallace Lee**, New York: Early impressions are often lasting. The first operation I saw was a cutting operation for a stone, by Donald McLean. It made such an impression on me that it has been lasting. The case was brought in and placed in the lithotomy position. There was not much attention paid to antiseptics in those days. McLean was dressed in his ordinary clothes. He washed his hands perfunctorily and picked up an instrument, a sound, and shoved it into the bladder and handed it to Dr. Frothingham. McLean said to always hand it to your best friend. The man's legs were held back in an exaggerated lithotomy position. He made a cut, poked in his finger and came out with the stone. No anesthetic had been used. He had not catheterized nor filled the bladder with water, nor washed it out. During my student days I saw many stones removed. The majority of those cases were operated upon by the left lateral operation. Since I have been in practice, I have operated on about 60 stones in various ways. Two or three by crushing, and I agree and appreciate what has been said with regard to the difficulty one has in operating with the Bigelow instrument. I am so awkward at this sort of work, that I would rather send it to someone else. I can see better than I can feel. In regard to the choice of operation, if it is an ordinary case without much cystitis, I prefer the suprapubic. If there is systitis, I prefer the median or the left lateral operation. I can appreciate that many who are familiar with the Bigelow instrument and operation prefer it, but as long as I do surgery, I shall cut, because I can do it better.

Dr. **W. S. Reynolds**, New York: I should like to call attention to a point in the diagnosis of vesical calculus in children. Some time ago, I saw an Italian boy seven years of age, who, on account of the pain and frequency of urination, and a history of possible gonorrhoea, was thought to have stricture of the urethra. The urethra was so small that no satisfactory examination could be made for stone, and what examination was possible, satisfied me that no stricture was present. Palpation of the bladder through the rectum, revealed a hard, rounded mass, the size of a large chestnut in the region of the prostate. I knew, of course, that in a child of that age, the prostate would be so small as to be hardly felt. I decided that stone was present, and an X-ray picture confirmed the diagnosis. Since that time I have seen several cases of calculus in men, but have not been able to make a satisfactory diagnosis by rectal examination.

Dr. **Follen Cabot**, New York: In regard to crushing stones, it can be practiced on the cadaver easily with pumice stone. Fuller believes that it is dangerous to remove stones through the perineum. On the whole, the crushing is the simpler and safer, after one has become familiar with it.

The President, Dr. **Ayres**: We have to thank Dr. Swinburne for the concise way of putting the subject, giving us all time to talk as well as he. I agree, that the crushing is the operation to be done wherever possible. If a man is not familiar with the use of the lithotrite, he should have his patients in a hospital. I crushed one stone in my office and there was but little bleeding, and the cystoscopic examination following was easy. I think the author was wise when he said he would allow the medical man to tell us how to prevent the formation of stone. Uric acid frequently comes from one side and not the other. I have sometimes found that the uric acid came from the diseased kidney, and in other instances, it has been more pronounced from the healthy kidney. It is up to the medical man to tell us where uric acid is formed and how it gets into the urine. I am afraid he will never do it and we will have to study it out for ourselves.

Dr. **G. K. Swineburne**: A patient will accept litholapaxy when he will refuse a cutting operation. The first case that I did on my own responsibility was done at the dispensary under cocaine. There were two large calculi, and I only crushed and washed out one, leaving the other, which was removed in like manner a month later. He did not go to bed, though told to, and he had no reaction at any time. Three months later I washed out a small calculus with the evacuator, and six months after this a lot of uric acid sand, and two years later another large calculus. This patient stated that he never would have consented to a cutting operation.

The trick of striking the tip in order to get the stone to settle within the jaws of the lithotrite is, I think, generally known to those who practice litholapaxy. I have often resorted to it. One case of very small stone, I remember, I had great difficulty in catching the stone in the first instance, and it was fifteen minutes before this was done. After that it took less than ten minutes to reduce it into proper size fragments. In spite of the fact of the length of time the lithotrite was in the bladder, the wash water in the evacuator was not even blood-tinged. In this case I had been deceived as to the size of the stone. I used the cystoscope, and a hurried glance revealed a stone I took to be the size of an English walnut. When it was removed it was found to be only the size of a filbert. I had viewed the stone while it was close to the telescopic opening and did not correct the occular impression.

None of my cases have had any marked reaction following the operation.

I did not take up stone in connection with prostatic enlargement, but left it to be brought out in the discussion.

As to one's inability to find the stone with the cystoscope—the greater one's experience, of course, the less likely for that to occur.

In adults we can frequently make out the stone by means of fingers in the rectum. I shall never forget one case I had, by examination, I thought the man had a large, smooth prostate; upon pressure with the finger the upper half disappeared into the bladder cavity. I suspected stone, but also a pocket behind the prostate, but on filling the bladder, and viewing it through the cystoscope, there was no pocket; the bladder was normally formed, yet when the blader was emptied the stone sought this position behind the prostate.

HEMATO-SPERMIA.

Candidate's Thesis for admission to The American Urological Association, 1905.

By E. **Wood Ruggles**, A. M., M. D., Rochester, N. Y.

THE subject of this paper is evidently a rare condition, judging from the infrequent mention of the same in modern medical literature. I have looked over very carefully, eight years, ending with 1897, of the *Index Medicus,* which mentions practically all the medical articles published in the world, and found the condition mentioned but four times. Kotzin published an article " Concerning Bloody Semen," in 1893, in a St. Petersburg medical journal; Hugues of Paris, wrote an article in 1894 on "The Pathology of Hematospermia;" Prof. Lydston of Chicago, published an article on " Hemorrhagic Emissions," in the New York *Journal of Cutaneous and Genito-Urinary Diseases,* in February, 1894; and Cantalupo published an article in "The International Archives of Medicine and Surgery," of Naples, in 1897, on " Non-Inflammatory Hemato-Spermia."

This symptom occurs as the result of several different lesions. When transitory, its source is generally easily found. A hemorrhagic emission may occur in an uncured case of acute gonorrhoea, whose possessor is so ill advised as to follow out the homeopathic motto, *"similia similibus curantur,"* and revisit the source of his affliction. The extreme congestion of every part of the penis filled almost to bursting with blood, during coitus, when added to an already existing inflammation of the mucous membrane, may cause an abundant transudation of blood, or even the rupture of the mucous membrane with some blood vessel or vessels and an abundant hemorrhage, as in one of my cases. Indeed, mixture of blood with the discharge in acute gonorrhoea is not at all rare.

Previous mechanical injury or even a wrongly directed movement during coitus may so rupture the urethra as to produce this symptom. When the hemorrhage occurs from the anterior urethra, its source is easily determined, since it will continue for at least an appreciable length of time after ejaculation, the blood either appearing of itself or being easily expressed from the meatus. If from the posterior urethra, it will not appear after ejaculation until the patient urinates, when it can be detected in the first portion of urine, or in both portions, if abundant. When from the urethra, the blood is not so thoroughly mixed with the semen as when it is from the seminal vesicles or prostrate and is, as a rule, brighter colored.

It is particularly important to follow up the history of the cases of injury to the urethra, as very frequently they are the starting point of a stricture, and such strictures are far more serious than those which follow gonorrhoea. I am reminded in this connection, of one of my patients, who, eight years ago, fell from his bicycle and struck his perineum on the mud-guard. Following the accident, he had some hemorrhage and a priapism which lasted ten days, and, since that time, in case of erection, the penis, instead of rising to the customary angle of 145 degrees with the horizon, barely reaches 90 degrees, and is strongly deflected to the left. This and the subsequent history point at once to the lesions produced: a more or less profound fracture of the left corpus cavernosum, with the development of cicatricial tissue, in consequence of which it is still imperfectly filled with blood during erection, and a tear in the posterior urethra, causing a stricture, which has caused gradually increasing difficulty of urination and other urinary symptoms, till the time when he came under my care, with partial retention and a severe cystitis.

Another source of hemato-spermia occurs in the crises of congestion in the enlarged prostates of old men. We observe, not so infrequently, in these cases, the ejaculation of semen or prostatic fluid, after a labored effort at urination, and this secretion is occasionally tinged with blood.

Excesses in coitus or frenzied masturbation may produce the same result. Acute gonorrhoeal seminal vesiculitis or prostatitis may give rise to the same condition, but in these cases the blood is more intimately mingled with the semen and is of a darker color, if it has exuded some time before ejaculation.

It is questionable if the source is ever in the testicle or epididymis. I have never read of bloody ejaculations in connection with epididymitis. It is conceivable were the condition less conducive to sexual abstinence.

There is no mention in medical literature, so far as I can learn, of hemato-spermia occurring in genital tuberculosis or in cases of malignant tumors of the testicle, epididymis, prostate or seminal vesicles, although one would rather look for its occurrence.

In all the foregoing cases, the hemorrhagic emissions are acute, transitory and one might almost say accidental.

In what I should term essential hemato-spermia, though I find no such distinction made by writers on the subject, the symptom is chronic, lasting months or years, there has generally been a previous attack of gonorrhoea, and the source of the hemorrhage is the walls of the seminal vesicles or perhaps the prostate also.

I have been able to get the particulars of twelve cases of hemato-spermia, six of which are my own. Professor Lydston of Chicago, in his article published in 1894, gives the details of five cases, although he says he has seen several others. In the first case, a sexual neurasthenic, who had suffered previously for several years from a protracted gonorrhoea, had noticed, during a number of months, that he had a rather profuse hemorrhage from the urethra after coitus, lasting for some time, and followed by hematuria for a day or so. Examination revealed a congested and irritable stricture three and one-half inches from the meatus. The slightest contact by the exploring bulb caused hemorrhage. The prostate, bladder and seminal vesicles were apparently normal. Dilatation of the stricture relieved the symptom completely. The second case was very similar, the hemorrhage depending upon several strictures in the anterior urethra and ceasing on their dilatation. The third case (nocturnal bloody emissions) had not suffered from gonorrhoea, but had produced a tender and enlarged condition of both prostate and seminal vesicles, by extreme indulgence in all the familiarities preceding the sexual act, without the relief of tension afforded by its full consummation. Ergot, the bromides and the occasional use of a cold sound, together with more rational sexual hygiene relieved him completely. Case four followed posterior gonorrhoeal urethritis and was also associated with an enlarged and extremely tender prostate and seminal vesicles. No strictures. Partial relief was obtained, but the patient gave up treatment and disappeared. Case five was similar to case four and here also no mention of cure is made. In the last three cases there was no bleeding after ejaculation.

Dr. Koch of Rochester, has given me some particulars of a case he had several years ago. The patient was a strong and healthy blacksmith, aged about forty; no previous history of gonorrhoea so far as could be ascertained. The hemorrhagic emissions in this case lasted over a year to the doctor's knowledge, and probably continue yet.

I will now give the details, so far as I have them, of the five cases with which I am acquainted.

CASE 1. W. G., forty-three years old, married. Seen first October 21, 1899. Had gonorrhoea twenty-three years ago, during which he drank and dissipated generally; had gleet and strictures which were later dilated. No further local trouble till a year ago, when he had a slight discharge which was checked in a few days. Since January he had noticed that his semen was tinged with blood, sometimes of a dark chocolate color, sometimes brighter, but never, apparently, quite fresh. There was no subsequent hemorrhage, following ejaculation, nor was the next urine passed bloody. Status praesens. Urine clear, containing a few filaments consisting principally of epithelial cells, with some bacteria, no gonococci. Urethroscopy was then performed, a Koch tube No. 26 Fr. being used, which entered with difficulty, though without any great pain. The prostatic urethra was extremely red and congested, and there were two ulcerated patches. The anterior uretha was also congested, the normal folds almost entirely lacking and the anterior half remaining open in the form of a tube, the walls being rigid instead of presenting the normal, funnel-shaped appearance. The anterior urethra bled profusely.

On massage the prostate was small and felt normal. The seminal vesicles were difficult to reach on account of superabundant adipose tissue, but nothing abnormal could be detected. The urine passed after massage was milky and contained some filaments, consisting of epithelium and an abundance of bacteria.

I believed the source of the blood to be the congested urethra, and made use of suprarenal extract as a means of diagnosis, relying on its strongly styptic properties to inhibit any urethral hemorrhage. At bedtime one night, I instilled two drams of a 10 per cent. solution of suprarenal extract into his posterior urethra and injected a syringe full (2½ drams) of the same solution in the anterior urethra. He then performed coitus, with a condom, immediately.

He brought me the contents next morning for examination. The secretion consisted of apparently normal seminal fluid, with the addition of red blood corpuscles, somewhat broken up. Urethral hemorrhage being thus pretty surely eliminated, I concluded that the bleeding, as in nearly all the chronic cases, was from the seminal vesicles and therefore beyond the reach of any rational local treatment.

This patient consulted me again in June, 1901, when I learned that the hemato-spermia was still present, and in addition the following symptom had developed itself: After the passage of a hard stool, he frequently noticed the presence of a thin, blood-tinged discharge at the meatus. He brought me a specimen of the same in a small vial, and, on microscopical examination, I found it to consist of spermatozoa in considerable number, and many red blood cells, of which part were perfectly round in outline and evidently fresh, but the greater number were partly disintegrated, being crenated or irregular in outline, showing that the exudation of blood is more or less constant, it being either forcibly expelled in ejaculation or pressed out mechanically by hardened faeces.

On this occasion I was able to supplement the negative testimony afforded by the suprarenal extract test and demonstrate the actual source of the blood. An instrument called a "thimble," devised by Dr. J. Rilus Eastman of Cincinnati, which lengthens the forefinger for the purpose of rectal massage by about an inch, enabled me to reach and empty the patient's seminal vesicles, in spite of his excessive adipose tissue.

I first washed out the urethra and bladder with boracic acid solution and then injected four ounces of the solution into the bladder, after which I massaged the prostate and caught the secretion expressed at the meatus. It consisted of normal prostatic secretion, containing principally small granular bodies (lecithin) epithelial cells and a few leucocytes, but no red blood corpuscles. On emptying the bladder, the fluid was also found to be free of red blood cells.

Another portion of boracic acid solution was injected into the bladder and the seminal vesicles were massaged by means of the Eastman thimble. The patient then voided the solution into a conical glass. At the bottom there settled several of the gelatinous bodies, called "moonstones," and the solution was streaked with blood. On centrifuging it and examining the sediment with the microscope, I found it to contain much granular matter, a few motionless spermatozoa, part of which were tailless and otherwise disintegrated, a small number of leucocytes and many red blood corpuscles, part of them with rounded outline, others considerably crenated.

These findings established the correct diagnosis, viz.: a congested non-inflammatory condition of the seminal vesicles attended with a chronic exudation of blood.

I advised the use of a Kemp or Chetwood rectal tube, with very hot water, quinine and strychnine internally and rectal suppositories of icthyol, hydrastine muriate and ergotin.

He came again in November, 1901, to announce that he had never carried out the treatment, but had been taking hot air baths at the so-called Meister Institute, and in addition having an air-tight boot applied to his feet and legs and a vacuum produced within. This produces considerable congestion of the parts and may possibly relieve congestion of the pelvic organs. At any rate from June till August, the blood in the semen decreased in amount and finally disappeared to the naked eye, to recommence in October, after cessation of the treatment. This patient is away from Rochester much of the time, and, like so many disciples of quacks, it is almost impossible to get him to follow out any regular line of treatment.

On March 28, 1903, I saw this patient again. He announced that he had had the same symptoms ever since, both during coitus, and as a rule, on straining at stool. General health good, especially since playing golf. Until lately, if he had intercourse twice in one night, there would be no hemato-spermia at next coitus. Now it is always present. The color is brighter than formerly. After massage with the Eastman "thimble," a bloody discharge containing red blood cells and a very few spermatozoa appeared at the meatus. Prescribed rectal douche twice weekly and suppositories of tannic acid gr. 2½ ext. hydrastis gr. 4.

November 3, 1903. Same symptoms, only that at every stool now he squeezes out some dark blood at the meatus. At intercourse, the semen is very dark, almost black. If immediately repeated it is lighter, if a third time it is only stained a little with blood. Has never followed out prescribed treatment.

December 8, 1905. The patient reports that during the past four or five months there has been practically no blood in the semen. The latter is very thin and occasionally slightly tinged with blood. His general condition has gradually improved and his sexual vigor has of late increased.

CASE 2. W. W., twenty-eight years old, suffered from gonorrhoea four years ago; since that time gleety discharge. Severe neurasthenia complicated by chronic prostatitis and seminal vesiculitis. This patient was greatly relieved by appropriate treatment, but later suffered a severe relapse. He inherits decidedly neurotic tendencies from both parents. I have recently learned that for several weeks he has suffered from hemato-spermia and has become greatly worried concerning it.

CASE 3. G. A. H., twenty-five years old. First gonorrhoea in August, 1898. It seemed trifling, but he has had a discharge most of the time ever since.

Status praesens, January 4, 1901. Meatus a little inflamed, and some watery discharge on milking urethra, containing a little pus and many epithelial cells; no bacteria. First glass of urine a little cloudy, second clear. On centrifuging the first, I found a much larger amount of pus and some colon bacilli. Prostate very large and firm in consistence. Could express no secretion from the meatus by rectal massage but, on washing out the bladder with boric acid solution and centrifuging and staining, found considerable pus and many colon bacilli. The seminal vesicles were apparently not diseased. His condition improved greatly while in Rochester, and he was free from discharge, till he one night drank six glasses of beer and spent several hours with a prostitute, as a test. It was entirely successful and the discharge returned.

On May 21 he wrote me that since seeing a specialist, in New York, who used a urethroscope upon him, the semen, whether during coitus or from a nocturnal emission "always comes with blood, is very red in color and there remain six or eight drops of blood in the urethra, which can be easily milked out."

CASE 4. R. L., twenty-four years old; heredity and general health good. First gonorrhoea on April 30, 1901. Discharge has lasted until date when seen, June 2. He has tenesmus unless he drinks beer, a rather strange phenomenon. On Monday night, May 27, about four weeks after infection, he performed sexual intercourse. Having arisen immediately afterward, he noticed that his penis was bleeding at the meatus. On inspecting the bed he found it soaked with blood, even through a feather mattress about four inches thick. The hemorrhage continued in drops for about half an hour longer.

This mishap evidently did not greatly alarm him, since he tried his luck again on Friday, May 31, four days later. On this occasion there was no repetition of the hemorrhage and coitus was performed in a normal and satisfactory manner.

Opinions may differ as to the source of this blood, but from the fact that the hemorrhage from the meatus continued for half an hour, it is safe to assume that it was from the anterior urethra. Any hemorrhage from back of the external sphincter would not appear except at urination or ejaculation. From the amount of blood lost, it is evident that a large blood vessel was ruptured.

CASE 5. V. J., twenty-six years old. Contracted gonorrhoea the first time in November, 1901. The case was a long one, but he finally supposed himself cured and nine or ten weeks after the infection, his physician advised intercourse. He noticed that there was blood in his semen and returned to the physician for further advice. Urethral crayons were employed for two or three weeks, and the next intercourse was bloodless, but hemato-spermia had been present ever since that time, until I first saw him, three months later. He had a gleety discharge and shreds in his urine, although discharged by his former physician as cured. He came to consult me for alopecia, and I did not examine the condition of the seminal vesicles, expecting to see him again. He did not return, but informed me subsequently that the symptom had entirely disappeared after a total duration of about six months.

CASE 6. July 19, 1904. Referred by Dr. Hague. Patient thirty-eight years old, married. Heredity and general health good. Gonorrhoea fifteen years ago, lasting ten weeks. Epididymitis. No "morning drop," or other symptoms since. Sexual intercourse normal except that he has performed withdrawal since marriage near the menstrual periods.

Last December or January, the patient noticed a slight reddish tinge of the semen at two successive copulations. The symptom then disappeared until two weeks ago, and again last week the semen exhibited a brownish color.

S. P. No discharge. First glass of urine clear, with a few shreds. Second glass clear. Slight narrowing of urethra felt at three and one-half inches with 27° Fr. acorn bougie. Prostate normal, seminal vesicles somewhat dilated and tender. Urine passed after massage contains moonstones, motionless spermatozoa, a few leucocytes, and a considerable number of red blood corpuscles.

Treatment. Massage was advised, but the patient did not reappear for this treatment. Tannin and iodoform suppositories were prescribed and employed every night for four weeks. Abstention from the practice of withdrawal insisted upon.

October 29, 1904. The patient reports that there has been no recurrence of the haemato-spermia.

Only the first and the last case have been under my care for this condition.

Prognosis. In the case of hemorrhagic emissions, occurring as the result of injury, acute gonorrhoea, and in general when the symptom is acute in character, the prognosis is good, though there is a possibility of some of these cases terminating in chronic seminal vesiculitis. When in connection with chronically inflamed seminal vesicles, or enlarged prostate it is doubtful so far as recovery is concerned, especially after having lasted for some months, although Professor Guyon of Paris, relates a case which suffered from hemato-spermia for years and finally recovered. As to the condition leading to tuberculosis or malignant disease, or exerting a deleterious effect upon the general health, save possibly in the line of worry, the prognosis is absolutely good, so far as one can judge from the limited amount of literature on the subject.

Treatment. In those cases dependent upon a congested and irritable stricture, gradual dilatation affords almost certain relief. In cases where prolonged sexual excitement, such as excessive indulgence in hugging and other tantalizing stimulation of the sexual sphere, without gratification, has produced congestion and irritability of the whole sexual apparatus, abstinence therefrom, or, where this is refused, prescription of proper sexual hygiene, tonics or sedatives as seem indicated, and the use of a cold sound will probably afford relief.

In the chronic cases attended with seminal vesiculitis, attention to proper sexual hygiene, massage, the use of hot rectal irrigations by means of the Kemp or Chetwood tube, the rectal and possibly the internal use of ergot hydrastin muriate and icthyol with the bromides where indicated, may result in cure. Local medication is impossible. We have no reason to suppose that remedies, introduced into the posterior urethra, penetrate to any depth into the prostatic or ejaculatory ducts.

348 University Avenue.

EDITORIAL.

CHRONIC PAINFUL NEPHRITIDES.

CHRONIC nephritides are ordinarily looked upon as indolent, and the absence of pain is, in point of fact, the rule, but there are exceptions. If renal pain is not present among the symptoms of chronic Bright's disease, generally speaking, the fact nevertheless has been made evident by surgeons that it should be included among them. As far back as 1898, Le Dentu insisted on this point, saying that there are instances of nephritides, either total or partial, which are accompanied by quite severe pain, frequently tenacious, and offering quite a marked resemblance in character to the pains produced by large renal calculi, so that a diagnosis is impossible without direct manual palpation. A year later Israel expressed himself in similar terms, stating that he had met with instances of nephritic colic due to nephritis, and which were quite identical to the colic produced by calculi. Then, again, in 1902, Rosving and Pousson called attention to this symptom, and the latter in a recent paper published in the Province médicale (July 14, 1906) relates the history of three patients upon whom he was obliged to operate on account of the intensity of their sufferings.

In certain cases, renal pain may be so marked as to mask the other symptoms and occasionally will be the only guide indicating the true nature of certain symptoms arising in chronic Bright's disease.

One of the most frequent causes of these cases of nephritis is renal lithiasis, and here one will usually obtain a history of the patient having previously expelled calculi or gravel with or without colic. In other patients, infectious processes will be elicited in the past history, such as inflammation of the adnexa or the connective tissue of the pelvis, while in others a traumatism may have occurred.

There is one peculiarity inherent to these painful kidneys, namely a thickening of the capsule which intimately adheres to the renal tissue, while frequently there is also a fibrous perinephritis, and these pathologic changes account for the presence of pain.

At the time of congestive attacks to which the inflamed kidney is exposed, the organ increases in size, but cannot distend on account of the compression offered it by the thickened and rigid capsule, and thus a compression of the nervous ramifications results. On the other hand, if it be admitted as Rosving claims, that the renal parenchyma is deprived of sensitive nerves, it would be the distension of the pathologically changed capsule, which gives rise to the pain, as the latter receives its innervation from the lumbar and dorsal nerves. The inflamed fatty capsule having contracted adhesions with the kidney, pulls upon the gland and may also be rendered responsible for the pain experienced by the patient.

It is unfortunate that clinically the diagnosis of this type of nephritis cannot be diagnosticated.

Renal calculus is usually thought of, and this diagnosis seems all the more probable on account of its frequency, while a perinephritic hematoma has been diagnosticated on account of the local tumefaction. The localization of pain in the costo-lumbar sinus, with extension towards the ureter, bladder and testicle, closely simulates the picture of nephritic colic. If, in some cases, the organ is found increased in size, it generally, however, is quite inaccessible to palpation. The urine contains granular and hyalin casts and albumin and occasionally the urea is diminished in amount. Generally speaking, diuresis is diminished in quantity, but, taking all these symptoms into consideration, they are of only small value.

One should endeavor to discover a history of renal lithiasis in the patient's antecedents, as well as any former inflammatory process in the pelvic region, because if this is ascertained, one will be put on the track of a diagnosis of painful nephritis.

However this may be, a correct diagnosis is only obtainable at the time of operation, which is decidedly indicated, on account of the persistency of the pain. Nephrotomy, which allows one to free the renal parenchyma from the capsule, is the operation of choice, as it does away with pain, while the quantity of urine and the amount of urea are increased. Nephrectomy is only to be advised in cases of absolute necessity, and especially after one is assurred as to the functional value of the opposite kidney. However, before resorting to surgery, all medical measures should be tried, and when these measures give no relief, resort must be had to surgical interference.

REPORT OF THE COMMITTEE ON REVISION OF THE CONSTITUTION AND BY-LAWS,[1]

To be presented to the American Urological Association, for action, at the Annual Meeting, June 4, 1907, Atlantic City, N. J.

CONSTITUTION.

ARTICLE I.

SECTION 1. *Name*—The name of this organization shall be THE AMERICAN UROLOGICAL ASSOCIATION.

SEC. 2. *Object*—The object of this Association shall be the study of the medical and surgical diseases of the urinary organs in both sexes.

ARTICLE II.

SECTION 1. *Members*—The membership of this Association shall be composed of those whose scientific work contributes to the progress of this branch of medical science, who shall be grouped as (a) Active; (b) Corresponding; (c) onorary members, and (d) Founders; but active members only shall have any right, title, or interest in the real or personal property, or funds of the Association, or be eligible for office, or have a right to vote.

SEC. 2. *Active Members*—An applicant for active membership must be a citizen of North, South, or Central America, a graduate of a reputable medical college, duly licensed to practice medicine in the state or country in which he resides, and must have been in active practice for not less than five (5) years.

SEC. 3. *Corresponding Members*—Any person not a resident of the American Continent, interested in the study of Urology, on recommendation of the Executive Committee, may be elected corresponding member, upon a majority vote of the Association.

SEC. 4. *Honorary Members*—Distinguished foreign Urologists to the number of ten, may be elected to Honorary membership, upon a two-thirds vote of the Association. They shall be exempt from dues.

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[1] Members wishing to offer amendments to this report, may send them in writing, before May 20, 1907, to A. Ernest Gallant, M. D., Chairman, 60 West Fifty-sixth street, New York City.

SEC. 5. *Founders*—Members who signed the Constitution and By-Laws within one month after organization, shall be designated Founders.

SEC. 6. *Certificates*—Every member of the Association, on completion of his membership, shall be furnished with a copy of the Constitution and By-Laws, and a duly authenticated certificate of membership.

SEC. 7. *Revocation*—This certificate may be revoked for cause; and in case of refusal to surrender the same, the Association may publish such revocation in its official journal.

SEC. 8. *Resignation*—Any member who has complied with all the requirements of the Constitution and By-Laws, may resign his membership, by letter to the Secretary-General, or the local Secretary; but no resignation shall be valid until accepted by his Society or the Association.

SEC. 9. *Discipline*—For violation of any of the rules or regulations of the Association, or for unprofessional conduct, a member may be reprimanded or suspended, by a two-thirds vote of the Executive Committee. Whenever the Executive Committee deems it advisible to recommend a member of the Association for expulsion, they shall notify him, in writing, in a sealed envelope, by mail, at least seven (7) days prior to the date set for action by the Association; otherwise no vote to expel shall be taken. A three-fourths vote of the members present shall be necessary to expel.

ARTICLE III.

SECTION 1. *Officers*—The officers of this Association shall be a President, Vice-President, Honorary Vice-Presidents, a Secretary-General, Treasurer-General, and an Executive Committee, who shall be elected at the annual meeting, and shall hold office for one year. Candidates for office must be active members in good standing, must be nominated according to the procedure prescribed in the By-Laws, Sec. 17, et seq., and must be elected by a majority of the members present at the annual meeting.

SEC. 2. *Official Vacancies*—Vacancies in the offices of Secretary-General or of Treasurer-General may be filled by the Executive Committee for the unexpired term.

ARTICLE IV.

SECTION 1. *Executive Committee*—The administration of the Association shall be in the hands of an Executive Committee, composed of (a) members ex-officio, viz.: the President, Vice-President, Secretary-General, Treasurer-General, for the time being; and (b) one member from each of the Sections laid down in the By-Laws, Sec. 18.

ARTICLE V.

SECTION I. *Standing Committees*—The Standing Committees of this Association, to be appointed by the President, shall be:

(a) Committee on Membership.
(b) Publication Committee.
(c) Auditing Committee.
(d) Committee on Arrangements.
(e) Committee on Program.

SEC. 2. *Nominating Committee*—A Nominating Committee, selected by and from the various members of the several Sections present at the annual meeting as prescribed in the By-Laws (Sec. 17).

ARTICLE VI.

SECTION I. *Branch Sections*—For the more active propagation of the work of the Association, fifteen (15) or more active members may, with the consent of the Executive Committee, organize a branch, to the entitled "The ——————, Society of the American Urological Association. Each Society shall elect its own officers, adopt by-laws, in conformity with those of the Association, and retain its own autonomy.

SEC. 2. *Honorary Vice-President*—The President of each branch Society shall be, ex-officio, an Honorary Vice-President of the Association.

ARTICLE VII.

SECTION I. *Amendments*—Amendments to this Constitution must be sent in writing to the Executive Committee at least one month before the annual meeting, be printed on the notice of the meeting which is sent to each active member at least one week prior; and may be adopted by a two-thirds vote of the members present.

BY-LAWS.

SECTION I. *Meetings*—The Annual Meeting shall be held on Monday, Tuesday, and Wednesday of the same week, and in the same city as the meeting of the American Medical Association. Morning sessions, 9:30 A. M. to 1 P. M.; afternoon sessions, 2 to 5 P. M.

SEC. 2. *Special Meetings*—A special meeting may be called at any time, by the President, a majority of the Executive Committee, or upon the written request of ten (10) members; at such time and place as the Executive Committee may designate; notice of which meeting shall be sent by mail to each active member, at least fifteen (15) days prior, stating the place, date, hour and special business for which the meeting is called; and no other business shall be conducted or enacted except that stated in the call for the meeting.

SEC. 3. *Quorum*—At all stated and special meetings, twenty (20) members shall constitute a quorum for the transaction of executive business.

SEC. 4. *Annual Dinner*—The annual dinner, subscribed for by the members, who may invite their friends to participate, pro rata, shall be held on Tuesday evening.

SEC. 5. *Scientific Sessions*—The Order of Business at the scientific sessions shall be:

(a) The President's Address.

(b) Original Communications.

(c) Presentation of Patients, Specimens, Apparatus, etc.

SEC. 6. *Papers*—Titles and abstracts of papers must be filed with the Secretary-General at least one month before the date of the annual meeting; and by him presented to the Committee on Program for consideration and approval. Any paper previously printed or presented before a scientific society cannot be read before this Association except at the request or on the approval of the Committee on Program.

SEC. 7. *Time-limit*—The reading of papers shall be limited to twenty (20) minutes; and discussion to five (5) minutes.

SEC. 8. *Special Papers*—Unexpired time, before the close of the sessions, may be devoted to the presentation of important communications from authors who failed to file their titles and abstracts at the proper time.

SEC. 9. *Visitors*—Upon invitation of a member, professional visitors may be admitted to the scientific sessions, but members only may present or discuss papers, except upon the invitation of the President or the Committee on Program.

SEC. 10. *Manuscripts*—All papers read become the property of the Association, and must at once be handed to the Secretary-General, for publication in the transactions, subject to the approval of the Publication Committee; the latter reserving the right to return to an author his paper for condensation or revision, or may decline to accept it for publication if they deem it below the proper standard of scientific excellence.

SEC. 11. *Discussions*—A stenographer shall be engaged by the Secretary-General to report all discussions, which shall be printed in the transactions in conjunction with the original papers.

SEC. 12. *" Read by Title "*—In the absence of the author, papers upon the official program may be " read by title," and if acceptable to the Publication Committee, may be published, as such, with the transactions.

SEC. 13. *Previous Publication*—Before publication in the transactions, no author will be permitted to publish more than an abstract of his paper in any other journal.

SEC. 14. *Reprints*—An author of a paper published in the transactions, may, at his own expense, secure reprints thereof, upon which must be printed the legend "Reprinted from the Transactions (or official journal) of the American Urological Association."

SEC. 15. *Publication; Editor*—The Executive Committee shall contract for the publication of the Transactions in an appropriate volume or in journal form, and appoint an Editorial Staff, who, in conjunction with the Publication Committee, shall publish the scientific and executive proceedings of the Association. Each active member shall be entitled to receive a copy of the Journal or Transactions, gratuitously.

SEC. 17. *Executive Session*...At the executive session, held on Tuesday afternoon, at 2 P. M., the Order of Business shall be:

(a) Reading of Minutes of the Previous Meeting.

(b) Reports of Secretary, Treasurer, Auditing Committee, Executive Committee.

(c) Reports of Committees on Arrangements, Program and Publication.

(d) Selection of Nominating Committee.

(e) Election of New Branches and Members.

(f) Unfinished Business.

(g) New Business.

(h) Report of Nominating Committee and Election of Officers.

SEC. 17. *Nominating Committee*—The officers—President, Vice-President, Secretary-General, Treasurer-General, and the other members of the Executive Committee, shall be nominated on the afternoon of Tuesday, by the Nominating Committee, which shall be selected in the following way:

(a) The members from each Section designated in Sec. 18, of these By-Laws, shall select from their own number, one for each twenty of their members in good standing, and present these names to the President for appointment on the Nominating Committee. The members of the several Sections may instruct their delegates as to whom they prefer for officers.

(b) *Election*—The Nominating Committee then retire, make their nominations, return and report to the President, who makes the announcement; this to be followed by election. A majority vote shall elect. (Constitution, Art. III, Sec. 1.)

(c) *Recess*—While the Nominating Committee is in session, the Association may take a recess, to reconvene when the committee is ready to report.

(d) *Installation*—The newly elected officers shall be installed at the opening of the last day's session; but the business of the Association shall be completed by the officers in charge.

SEC. 18. *Sections*—For the purpose laid down in Sec. 17, the Western hemisphere shall be divided into the following Sections:

(a) North Atlantic Section: Maine, New Hampshire, Vermont, Massachuetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Canada.

(b) South Atlantic Section: Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, District of Columbia, Mexico, Central and South America, West Indies.

(c) North Central Section: Illinois, Indiana, Ohio, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North and South Dakota, Nebraska, Kansas.

(d) South Central Section: Kentucky, Tennessee, Alabama, Mississippi, Lousiana, Texas, Arkansas, Oklahoma, Indian Territory.

(e) Western Section: California, Colorado, Arizona, Idaho, Nevada, Oregon, Utah, New Mexico, Wyoming, Washington, Alaska, British Columbia.

SEC. 19. *Income*—The income of the Association shall be derived from the following sources: (a) *Initiation*—Initiation fee of ten (10) dollars, in lieu of the annual dues for the current year, which must accompany the application for membership. (b) *Dues*—Annual dues of (5) dollars, payable by every active member, at the annual meeting, or within three months thereafter. (c) The sale of the Transactions or other publications of the Association. (d) *Assessments*—The Association may levy on each active member, one or more assessments, not to exceed the sum of five (5) dollars in any one year; subject to a three-fourths vote of the members present at the annual meeting.

SEC. 20. *Arrears*—Any member three months in arrears to the Association, shall be notified thereof, and in event of non-payment, he shall be dropped from the subscription roll of the Journal and from the list of members of his Society and the Association.

SEC. 21. *Collection of Dues*—The Treasurer-General shall collect an initiation fee of ten dollars, and the annual dues of five dollars from each active member, non-affiliated with a branch Society.

SEC. 22. The Treasurer of each branch Society shall collect the initiation fee, or the annual dues from each active member in affiliation therewith.

SEC. 23. *Branch Income*—The expenses of branch Societies shall be provided for as follows: (a) One-half of each initiation fee; and (b) One dollar of each annual dues collected during the year; the balance of five dollars from each initiation fee, and four dollars from each annual dues must be forwarded to the Treasurer-General within thirty days after date of collection.

SEC. 24. *Excess*—Any expenditure on the part of a branch Society in excess of the above income, must be met by assessment of its own members.

SEC. 25. *Exempt*—Honorary and Corresponding members shall be exempt from dues; but if they desire to subscribe for the Transactions or the Journal, they may do so at cost price to the Association.

SEC. 26. *Official*—The duties of the officers of this Association shall be such as usually devolve upon the President, Vice-President, Secretary and Treasurer of an Association.

SEC. 27. *Ex. Com. Meetings*—The President shall call and preside over all meetings of the Executive Committee; and its minutes shall be recorded by the Secretary-General, or an assistant secretary, whom they may appoint.

SEC. 28.. .*Standing Committees*—The newly elected President shall appoint the following Standing Committees (see Art. V, Sec. 1, Constitution.)

(a) A Membership Committee of three which shall pass on all applications for membership filed with the Secretary-General, and present the same to the Association for election at the annual meeting.

(b) *Publication*—A Publication Committee of three, with the Editor as chairman, which shall have charge of all publications, control of the Journal, and shall publish the scientific and executive proceedings of the Associatoin.

(c) *Audit*—An Auditing Committee of two which shall go over the accounts of the Treasurer-General, and report to the Association at the annual meeting.

(d) *Arrangements*—A Committee of Arrangements of five members, which shall secure a meeting hall, and make all the necessary arrangements for the annual meeting and entertainment of the Association.

(e) *Program*—A Program Committee of two, with the Secretary-General as chairman, which shall have charge of the program of the scientific and executive meetings.

SEC. 28. *Secretary-General*—The Secretary-General shall (a) arrange the daily program; (b) keep the records of the general meetings; (c) the minutes of the executive sessions; (d) the minutes of the Executive Committee meetings; (e) take charge of the papers, etc., presented before the Association; and (f) give prompt attention to the correspondence. He shall also (g) keep an accurate list of the members, their applications, addresses, and a roster of attendance at the annual meeting.

SEC. 29. *Treasurer-General*—The Treasurer-General shall send out bills to all members not in affiliation with a branch society, upon which shall be printed those portions of sections 19 and 20 of these By-Laws which refer to the payment of dues and arrears. He shall keep an alphabetical list showing the actual standing of all members; a cash book; and a bank account in the name of the Association.

SEC. 30. *Disbursements*—The Treasurer-General shall not disburse any moneys of the Association except on warrants ordered by the Executive Committee and signed by the President. Payments shall be made only by checks drawn on the account of the Association.

SEC. 31. *Applications*—Applications for membership in this Association must be made in writing upon blanks provided, sent to the chairman of the Membership Committee, of the branch Society, and if by it recommended for membership, a three-fourths vote of those present shall be necessary for election.

SEC. 32. *Non-affiliates*—Those seeking membership in the Association, residing at a distance from a branch Society, may file their application with the Secretary-General or one of the Membership Committee, which shall report at the next annual meeting; a three-fourths vote of the members present being requisite for election.

SEC. 33. *Application Blank*—All applications for membership must be made upon the following form:

...................................19..

TO THE AMERICAN UROLOGICAL ASSOCIATION,
........................Society.

I, the undersigned, hereby make application for Active membership and enclose ten dollars ($10.00) for initiation fee and dues for the current year.

I graduated from....................................
received a license from the State of..........................
am a member in good standing in..............................
....
....
Hospital appointments..
....
Teacher in..
Signed....................................M. D.
Endorsed.............. ....Street.
by.................... ....City.
Approved by........... ....State.

N. B.—This application must be endorsed by two members in good standing, and finally approved by the chairman of the Membership Committee, before being presented to the Society.

SEC. 34. *Question of Order*—All questions of order, not provided for in these By-Laws, shall be determined by parliamentary usage as found in Roberts' Syllabus of Parliamentary Practice.

SEC. 35. *Amendments*—These By-Laws may be suspended, temporarily, for a specific purpose, by a unanimous vote, at any stated meeting of the Association. They may be repealed or amended by a three-fourths vote of the members present and voting at any stated or special meeting, provided that the proposed amendment shall have been printed on the notice for the meeting at which such action is to be taken.

A. ERNEST GALLANT, Chairman,
BRANSFORD LEWIS,
F. R. HAGNER,
HUGH CABOT,
CHARLES CHASSAIGNAC,
Committee.

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THE HEMATURIA OF CHRONIC NEPHRITIS[1]

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IN the earlier days of renal surgery, it was possible to operate upon only such renal hematurias as presented beside the bleeding some definite localizing symptoms, such for instance as tenderness, unilateral pain or a one-sided mass. The introduction of the cystoscope, however, permitted the definite localization of the bleeding side in practically all cases, while the improved operative technique justified renal exploration for somewhat less vital indications. These two factors led to the operative investigation of an increasing number of cases of renal hematuria, undertaken for the most part, under the idea that one had to do with one of its three long-recognized causes, calculus, new growth, or tuberculosis.

A certain number of the hematurias thus operated upon, however, showed no gross abnormality of either the kidney or kidney pelvis, but an organ that was macroscopically normal, and for a time these cases were considered instances of " essential hematuria," " renal hemophilia," " angio-neurotic bleeding," or in the cases where pain had been a prominent symptom, " neuralgic hematuria."

The idea that these hemorrhages that were often profuse and usually unilateral should arise without anatomical change in the kidney, as the above-mentioned names indicated, did not seem quite probable to some men, and bleeding kidneys that were macroscopically normal, or sections from such kidneys were from time to time submitted to microscopical examination in the hope that a really satisfactory explanation for the bleeding would be found.

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A considerable proportion of these kidneys when examined microscopically, showed that they were the seat of some form of chronic nephritis, though macroscopically they appeared normal.

While chronic nephritis is perhaps not a very generally recognized cause of hematuria, particularly of profuse hematuria, there are now a sufficient number of carefully reported cases to demonstrate the fact that a chronic nephritis has been associated with too large a proportion of these cases of renal bleeding to render it probable that the association is accidental. Cases of this type differ essentially from the cases of hemorrhagic nephritis that are reported from time to time, in that they show no signs of an acute nephritis, or of an acute exacerbation of a chronic nephritis. They are also unlike the instances of hemorrhagic nephritis in that the hemorrhage is sometimes very profuse and often of long duration.

The following case that I had the opportunity of seeing in December, 1905, with Drs. Whitney and Winn, is of interest as illustrating one of the types of hematuria that have been found in chronic nephritis. This particular case was of the type showing anemic infarcts. This sort of infarct should not be confused with the examples of acute septic infarcts very recently reported by Brewer. Possibly these hematurias, due to infarcts, should be considered quite by themselves, but as the infarcts have appeared in kidneys showing chronic nephritis, and as they probably depend upon this process, they are considered as one variety of the bleeding of chronic nephritis. Apparently they are not very common. Rovsing, Stick and Israel, however, describe cases that appear to be of this type.

The patient was a man forty-six years old, with an unimportant family history. He had been very alcoholic at times and had an old specific history, as well as the history of a urethral infection. In June, 1904, he had what was supposed to be an acute nephritis, with smoky urine, following the injection of carbolic acid into some hemorrhoids. In the light of what we now know, I think it probable that this was an acute exacerbation of a chronic nephritis of infectious origin rather than the beginning of his renal disease.

This nephritis cleared up after a considerable number of months and he was apparently well. In May, 1905, he had an attack of pain in his back which lasted some days and which was referred to his left side. Again in August, 1905, he was in bed for a week with pain in his left loin, and during three days of this week he passed bloody urine. On November 27, 1905, he began without cause, to pass bloody urine. At first the hematuria was intermittent, after a few days each specimen was uniformly bloody. The attack of bleeding was painless, though after a time the urine contained a considerable number of clots. The employment of rest in bed for a month, and of various astringents and vaso-constrictors, including ergot and adrenaline was without effect, the bleeding increasing rather than diminishing. Two cystoscopic examinations showed that the blood came from the left ureter. Repeated urinary examinations by Dr. A. E. Austin, showed an alkaline reaction, a specific gravity varying from 1002 to 1013, and about ½ per cent. of albumin. One 24-hour quantity of urine was as high as 2250 c.c., with a total of only 15 grams of urea. Thirty slides from different specimens showed no casts, but large numbers of normal and crenated blood corpuscles, together with pelvic and renal cells in considerable numbers, also some pus cells and many calcic oxalate crystals. No tubercle bacilli were found in slides made from the sediment. The inoculation test was also negative though its result was not known until some time after operation. From the urinary examination the most probable diagnosis seemed to be calculous pyelitis.

At the time I saw this man, a month after the beginning of his hematuria, he was distinctly pale and had lost his strength to a considerable degree. The urine was a very dark red and contained a considerable number of clots. The cystoscope showed a normal bladder, with blood and an occasional small clot issuing from the left ureter. The urine from the right ureter appeared to be transparent, but the amount of blood was so great that I was not successful in the only attempt I made to catheterize it. One or two effluxes would make the bladder medium so dark that I could see little. Neither kidney was tender nor definitely palpable. There had been no elevation of temperature. The heart was normal. Calcium chloride and gelatine were tried for a week, but there was, if anything, an increase rather than a diminution in the bleeding. As the patient was losing strength steadily, and as the diagnosis lay between renal stone and the bleeding of chronic nephritis, exploration was advised.

On December 31, 1905, the left kidney was cut down upon and found to be slightly enlarged, congested and adherent to its fatty capsule. On its convex surface there was a large bleb filled with bloody fluid, but otherwise the kidney showed no marked surface changes. The capsule was separated and the kidney incised at a point a little posterior to its median line. Digital exploration of the pelvis and calices showed no stone or other abnormality. Under the superficial bleb there was a triangular area extending from the cortex to the pelvis. Here the tissue was much paler than at either pole. A section of this pale area and of the more normal-looking tissue at the upper pole, was removed for microscopical examination. A tube was placed in the pelvis, the kidney surfaces approximated with heavy catgut sutures, and the kidney fixed to the lumbar incision. After operation, the bleeding began to diminish and in thirty-six hours the urine was macroscopically clear. Seventy-two hours after operation, following straining due to a rather constipated dejection, this patient began to bleed profusely. When seen his condition was such as to convince me that an immediate nephrectomy offered him his best chance of recovery, and this was carried out as rapidly as possible. His convalescence was slow, but presented nothing of particular interest.

The sections of kidney tissue removed at the first operation were submitted to Drs. Leary and Medalia for microscopical examination, and showed a chronic interstitial nephritis in an early stage. The kidney which was also examined, had the outward appearance of being fairly normal, but showed on microscopical examination, places where the interstitial connective tissue was infiltrated with small round cells, while some glomeruli showed hyaline degeneration, and others marked pericapsular thickening. In places the epithelium of the convoluted tubules was swollen, granular and fatty, and the tubules themselves filled with hyaline material. Henles loops and the collecting tubules contained fairly abundant hyaline casts. Beside these evidences of chronic nephritis, the kidney contained several anemic infarcts. These infarcts with the exception of the one mentioned as being under a sub-capsular bleb, were not in the line of incision, and there seemed no doubt from their appearance that they all antedated the operation by a considerable time. There was a marked pyelitis.

Slides made from the sections removed at the operation showed no organisms. There were no changes in the renal artery.

After the nephrectomy, the quantity of urine went up to 50 ounces. The specific gravity rose to 1016, and the urea increased to 2.10 per cent., while the albumin immediately fell from ½ to 1-10 per cent. The sediment showed hyaline and fine granular casts, a little blood and a few leucocytes, a condition that I believed due to the irritation of two etherizations and the extra work thrown on the right kidney.

This man has now been at his usual work since early in April and is in very fair health. There has been no more bleeding. A recent specimen of urine (May 17), was rather high colored, with a specific gravity of 1021, perfectly transparent and without visible sediment. It was acid and showed by the heat test the slightest perceptible trace of albumin. The amount of urea was 2.52 per cent., and the 24-hour quantity about 35 ounces. Microscopically the urine contained a few leucocytes, a few red blood capsules and an occasional epithelial cell. No casts could be found.

To Keersmaecker belongs, I believe, the credit for first calling particular attention to this very interesting type of hematuria, about which there has been considerable discussion in the past few years, and concerning whose cause and treatment writers have by no means agreed. Since Keersmaecker's paper in 1897, the various phases of the subject have been considered in papers by Rovsing, Israel, Naunyn, Hofbauer, Klemperer, Senator, and Pousson. More recently Klink, Stick, Askanazy, and Ekehorn have written on the subject. Beside their papers, there have been a number of shorter communications and case reports. Naturally much that bears on the subject has appeared in articles on the surgical treatment of nephritis.

I shall not attempt a complete review of the subject, but shall confine myself to certain deductions that I believe a study of the literature now warrants one in drawing, and to the mention of some points that seem to me of particular interest.

A consideration of the opposing views that the publication of the first case reports brought forth, gives perhaps, the clearest idea of the subject as it stands to-day and seems for this reason the best way to approach it. Much of the discussion that arose, and in which the internists were almost without exception, arrayed against the surgeons, was due to the unfortunate use on the part of the surgeons of the term " Bright's disease," and to the apparent failure on the part of internists and surgeons alike, to recognize a chronic nephritis of other than toxic origin. The internists very naturally believed that in the interstitial type of nephritis of toxic or degenerative origin, commonly known as Bright's disease, both kidneys were affected to much the same degree: that an operation was to be resorted to only when life was actually threatened from hemorrhage, and that it could have no curative action in the sense of staying the process of the disease or causing a retrogression of it. The surgeons, on the other hand, reported bleeding kidneys or sections from them, that showed chronic nephritis microscopically, and in the cases that at a later time showed not only a lack of hematuria but an albumin-free urine, they argued that they had been dealing with instances of chronic nephritis that had been greatly benefited, if not cured, by surgical treatment. From the cases in which kidneys that showed chronic nephritis had been removed, and later the urine was without the signs of nephritis, they argued that a chronic nephritis could be unilateral. The cases that had cleared up after a nephrotomy, strengthened the probability that certain cases of nephritis were unilateral and seemed to definitely demonstrate the efficacy of surgical treatment.

The medical men held, from their knowledge of nephritis, practically restricted to that of the toxic type, that both these things were quite impossible. They said that the mere clinical evidence afforded by the absence of albumin and objective signs in the urine, was not sufficient proof that in the one instance the process had been cured, or in the other that the remaining kidney was not involved. They cited as proof, Cassel's observations on nephritis without albumin and the constant presence of double lesions in the autopsy findings in cases of chronic nephritis.

It remained for Rovsing to point out what I believe to be the key to the whole situation. He showed that some of his cases of nephritis with hematuria, presented a urine that was infected; that they were instances of nephritis of infectious origin rather than a nephritis plus an infection. Not only this, but that an area of nephritis of this type could be limited to one kidney or part of a kidney. He also showed that these cases of nephritis of infectious origin, gave a picture under the microscope that could not be distinguished from the interstitial or parenchymatous nephritis of toxic origin. The accuracy of Rovsing's clinical observations are borne out by the work of Castaigne and Rathery, who found from post mortem investigation and experimental work, that while a nephritis of toxic origin was always bilateral and involved both kidneys to much the same degree, that a nephritis due to either an ascending or hematogenous infection could be limited to one kidney or part of a kidney. This knowledge that we may have a one-sided or even localized focus of nephritis is not only of importance in connection with these cases, but should be borne in mind in the consideration of nephritis in general and especially in the consideration of its surgical treatment.

Unfortunately many of the recorded cases have been reported with rather scanty detail, so that some of them, particularly the earlier ones, cannot be considered, but a study of the well reported cases makes it seem perfectly evident that these hematurias have arisen in cases of chronic nephritis which for purposes of prognosis and treatment should be divided into three different groups. A recognition of these groups helps to reconcile the conflicting views that have been expressed on the subject, and also accounts for the different symptoms found and the different results obtained.

In the first group should be placed, I believe, those hematurias that arise in cases that are frankly instances of chronic nephritis of the usual toxic or degenerative type, showing a urine and the other signs of an interstitial, parenchymatous or diffuse nephritis. Examples belonging to this group have been reported by Loumeau, Klink, Stick, Israel, Potherat, and Rovsing. While in most instances the hematuria has been unilateral, the nephritis has been bilateral. The results obtained by operation have not been particularly encouraging.

The second group should comprise those hematurias arising in nephritides that are still infectious at the time of the hemorrhage, examples of which have been reported by Rovsing, Hofbauer, Israel, Legueu, and others. Lastly, it seems likely that some of the hematurias have been in cases of chronic nephritis that *were* of infectious origin, but had become non-infectious at the time of the hemorrhage. For the existence of this last group there is less proof than for the other two, but nevertheless there is some evidence that is highly suggestive, as Keersmaecker's case, some of Rovsing's and possibly Legueu's and Dowd's cases. In this connection it should be stated that in many instances no bacteriological study has been made, so that we are in doubt as to whether the condition was infectious or not.

The above grouping is, I believe, a natural one, one that reconciles the conflicting observations of different writers, and has a distinct bearing on the prognosis and treatment of these cases.

Another much discussed point, that in theory does not concern us particularly, but in reality is of considerable moment, as will be evident when we consider the lack of symptoms that some of these cases have shown, is whether or not there are cases of kidney bleeding of angio-neurotic origin as Klemperer believes, or instances of bleeding from a sound kidney as some have held.

For the most part the cases that are cited to uphold these theories, rest on what one must consider to-day as wholly insufficient evidence. In many the conclusion that the kidney was normal was drawn from its gross appearance, now known not to be sufficiently accurate, since a considerable proportion of cases of this sort that have shown changes under the microscope, have appeared macroscopically normal. In relatively few of these bleeding cases has a careful microscopical examination been made, and the kidney found normal. Even in these instances, this purely negative evidence is not of great value in supporting the theory of hematurias arising from normal kidneys, or of hematurias of angioneurotic origin, since as Zondek has pointed out, in none of these cases has the possibility of the ureter, as the source of the hemorrhage, been ruled out. In those cases where a kidney has been declared normal on the examination of a small section removed at the time of operation, the possibility of isolated foci of nephritis of infectious origin has not been excluded. The cases that have been considered instances of renal hemophilia and yet have not bled from the operation wound, are evidently unwarranted diagnoses.

The conclusion that I feel we must draw concerning these cases of bleeding supposed to be without anatomical lesion is, that in none of the reported cases has the investigation ruled out all the lesions that it is recognized may produce a hematuria. So much for the conflicting views and the conclusions that I believe we are warranted in drawing, in the light of the greater number of cases that are now recorded.

There are certain points in the symptomatology, diagnosis and treatment of those cases, that are of considerable interest. The great difference in symptoms that these cases show is due to the fact that these hematurias occur in different sorts of nephritis. In all cases the hematuria is the striking symptom. In certain cases it is almost the only one, so that as Malherbe and Legueu have remarked, " it may seem to constitute the whole disease." It is this circumstance, the practical lack of all other symptoms in the ocasional case, that gives importance to the question as to whether we do or do not have " essential hematurias." Though there are usually slight premonitory bleedings, in some cases the hematuria is sudden and so profuse as to apparently endanger life through immediate loss of blood. In other cases the hematuria is less profuse, but its long duration reduces the patient to an anemic condition that renders his usual occupation impossible. Thus in Hofbauer's patient, who bled at intervals over a period of two years and constantly for one year, the hemoglobin was reduced to 25 per cent. at the time of operation; ten months later it had increased to 75 per cent. Certain cases do not bleed constantly, but the hematuria appears regularly on exposure to cold or after unusual exertion, or it may appear at irregular intervals and without aparent cause. The duration of hematuria has been very considerable in several cases. In Hofbauer's case, cited above, it was constant for a year, while Keersmaecker's original case bled constantly for two and one-half years. The hemorrhage has been unilateral in the great majority of cases, though instances of bilateral hematuria have been reported by Legueu and Nicolich. One would expect that the bilateral hemorrhages would be more frequent in cases of the toxic type.

While the urine has usually been of a dark, port-wine color, instances have been noted where it has been bright red. Rovsing, Pousson, and Bowlby report such cases. The amount of albumin is usually in proportion to the amount of blood. In a considerable number it has been given as about ½ per cent.

Pain is an inconstant symptom, and where present it is probably due to capsular thickening or pericapsular adhesions. In many of the cases the hematuria has been absolutely painless—in others there has been a feeling of discomfort rather than of pain —in some there has been sharp pain referred to the lumbar region. This pain has rarely been of the colicky type, and has not seemed to depend on the passage of clots, since it has been wholly wanting in patients who, like the reported case, have passed many clots, and present in others who have passed few or no clots. Pain has as a rule, been most marked in cases showing at operation a marked paranephritis with dense adhesion of the kidney to its fatty capsule. According to Rovsing, the true renal capsule is practically the only part of the kidney supplied with sensory nerves and conditions that over-distend it or interfere with its normal distensibility, are the only ones that produce pain. Sometimes the bleeding kidney is found enlarged. It is then usually tender and sometimes painful as well. In other cases, as in the one I have reported the kidney has been neither palpable nor tender.

The urinary findings in these cases are not characteristic; they are uniform only in that all show blood and albumin. Renal casts may be entirely absent, as happened in the reported case, in which thirty slides taken from different specimens failed to show any. Casts are usually found in the cases that depend on a nephritis of the toxic or "medical" type. Their absence in the hematurias that depend on a focus of nephritis of infectious origin, is probably due to the fact that the blood passes through the tubules in the diseased area too rapidly to allow coagulation to take place. This would account for the fact that in the intermittent cases casts may be found in the intervals between hemorrhages, while a careful search fails to show them during the attack, as has been pointed out by Israel. The urine is sterile in some cases—in others it shows organisms. In a large proportion of the cases there is no report of bacteriological study. In the infected cases there is usually a certain amount of pus and epithelium. In relatively few cases have oedema, cardiac and vascular changes been noted.

The immediate cause of the bleeding probably differs in the cases that show anemic infarcts, and those that do not. In the infarcts the bleeding probably comes from the vessels in the periphery of the region, and is due to an area of negative pressure. That this is not necessarily so seems probable from Rovsing's case

II (1902), in which there were small infarcts and yet blood was present in the glomeruli and tubules in the area of localized aseptic nephritis. In the other cases, the hemorrhage seems to arise within the glomerulus, most often from the Malpighian tuft, for even in the cases in which the change has been most marked in the interstitial connective tissue, the Malpighian tuft, or the capsule, or both, have shown changes and the capsule and tubules have been found distended with blood. With the exception of the infarct cases, it is improbable that hemorrhage occurs in cases with absolutely no glomerular changes. It is possible that some congenital defect or slight acquired abnormality may be an important contributory factor in bringing about the bleeding in these cases, for hematuria occurs in but a relatively small proportion of all cases of chronic nephritis.

The diagnosis of these hematurias may be most difficult even with the help that cystoscopy and ureteral catheterization affords us. Cystoscopic examination allows us to determine with comparative ease the all-important point of which side the bleeding is from. The condition with which these hematurias are most likely to be confused are the bleedings of malignant disease, tuberculosis, calculus and the rare instances of bleeding of ureteral origin. The cases of true renal hemophilia have presented a family or personal history, or both, that have rendered their recognition easy, as illustrated by the cases reported by Imbert and Nonne.

If in addition to hematuria, one finds the urinary conditions commonly seen in chronic nephritis, the diagnosis is pretty well assured; this is especially so when cardiac and vascular changes are also present. With the cases that show for the most part simply hemorrhage, the question is more difficult. If the hemorrhage has existed for some time, but without cachexia, the probabilities are against malignancy. The converse, however, is not necessarily true since the anemia due to a persistent renal hemorrhage may be very suggestive of the cachexia of malignant disease. Of more value in ruling out malignant disease is finding an infected urine on the bleeding side. In those instances where the bleeding is from an area of nephritis that was originally due to infection, but has become aseptic, the urine itself may, in the absence of casts, show nothing to differentiate the condition from the bleeding of a malignant growth. The finding of bits of cancer tissue, as has happened occasionally in malignant disease of the renal pelvis, or the presence of an enlarged and irregular kidney, will remove all doubt as to the cause of the bleeding.

A normal bladder with normal ureteral orifices is against tuberculosis, and this can be practically ruled out if the results of guinea-pig inoculations are negative.

The question of renal calculus is sometimes most difficult to determine, especially in the cases of chronic nephritis that present pain. One may have an infected or an aseptic urine in either chronic nephritis or calculus, just as one may find a few casts in either., An increase of bleeding caused by exercise, or more especially a diminution brought about by rest, is suggestive of calculus, as is the history of the previous passage of renal stones. Properly taken radiographs should allow one to rule out all sorts of calculi with the exception perhaps of pure uric acid stones. In some instances it may be impossible to differentiate between the bleeding of a chronic nephritis of the second or third group and one due to a uric acid renal stone.

The possibility of the hemorrhage being of ureteral origin can be ruled out by collecting specimens, by means of a ureter catheter, at different heights along the ureter. If all the specimens are bloody, the source of the bleeding is above the ureter, while bloody urine from the lower part of the ureter and clear urine from the kidney pelvis points to the ureter as the source of the hemorrhage.

If time is afforded for a careful examination and study of these cases, an accurate diagnosis should be possible in a considerable proportion of them, though in some a definite diagnosis will probably be impossible before operation. In addition to determining that the hematuria is due to chronic nephritis, one should also determine if possible what sort of a chronic nephritis the bleeding depends upon, whether a nephritis of toxic origin, one due to an infected area in the kidney, or one due to an area that was at one time infected, but that has at the time become aseptic. The examination of the well kidney may help in determining this. If the urine from the non-bleeding kidney shows the characteristics of a chronic nephritis, the probabilities are that the bleeding kidney is also the seat of a chronic nephritis of toxic origin. If, on the other hand the non-bleeding kidney shows neither infection nor kidney elements the nephritis is localized, and bacteriological examination of the urine from the bleeding kidney will settle the point as to whether the process is infectious or aseptic.

The prognosis in these hematurias, as well as the treatment, will depend largely on the type of the underlying nephritis. It is evident that nephrotomy would be undesirable and nephrectomy utterly out of the question, in cases of toxic origin, while in the infectious cases nephrotomy might be desirable and even nephrectomy permissible. In some of these cases the question as to whether our treatment shall be expectant or operative, is almost as difficult to determine as is the question of diagnosis. In the patients who are being weakened by a profuse hemorrhage or by a lesser but long-continued one, the treatment should be operative, as should be the case in those patients who bleed on exertion, even though they do not when they are quiet. With the lesser degrees of hematuria that are not making any considerable impression on the patient's strength, the indications are not so clear. Hematurias, probably of this type that have bled for a very considerable time and yet have recovered under expectant treatment and have remained well, are reported by Klemperer, Naunyn, and Casper. In all cases where pain is combined with the bleeding, I believe we have a very definite indication for operative treatment, as I also believe we have when the process shows infection. In the latter instance it seems likely that the sclerosing process would have a tendency to gradually extend if untreated. A point that can be raised in favor of advising operative treatment pretty generally in hematurias of doubtful origin, as many of these cases will be, is the great difficulty of ruling out malignant disease with certainty.

Various operative measures have been advised in the hematuria of chronic nephritis. Nephrolysis and decapsulation usually combined with nephropexy are recommended by some, while others advocate nephrotomy as a routine measure with nephrectomy in certain cases. All have been successful and all but nephrectomy have at times failed to stop the bleeding. In Nimier's case, nephrectomy failed, but the report gives no assurance that the other kidney was not bleeding at the time of operation. In the cases that are frankly instances of medical or toxic nephritis, probably separating the adhesions of the kidney to its fatty capsule followed by decapsulation and nephropexy is the best procedure. Under no conditions should a nephrectomy be done, and a nephrotomy is to be avoided on the ground that in a certain number of instances it must be followed by a secondary nephrectomy, as happened in Wulff's case, one of Rovsing's and the one I have reported. In the infectious cases, on the other hand, I believe we should add nephrotomy to the freeing of the kidney from its adhesions. Rovsing, however, believes that a nephrotomy is not wise in these infected cases and gives as his reason the possibility of the infection spreading and involving the rest of the kidney. He believes that the improved circulatory conditions brought about by nephrolysis and nephropexy are sufficient to remedy both the hematuria and the infection. Israel on the other hand, advocates nephrotomy and drainage in these cases. Though nephrolysis and decapsulation would probably be sufficient for the control of the hematuria, nephrotomy would seem to me much the surer way of ridding the kidney tissue of infection, and with proper provision for adequate kidney drainage the danger of lighting up the infection would seem small. With the cases that show areas of nephritis due to a former infection, it is a question whether nephrolysis and decapsulation are not sufficient, though the more direct drainage afforded by nephrotomy would seem to give the kidney a better chance of ridding itself of inflammatory products. I believe that a primary nephrectomy can seldom be indicated, though it has been done many times, both in the earlier cases, like those of Keersmaecker and Poirier, and also in some reported within the last year, as in those of Fowler and Gunn. The large number of primary nephrectomies is undoubtedly due to the fact that the nature of the condition has not been recognized at the time of operation. In this connection a case that Nicolich reported is of great interest. In 1899 he removed a bleeding kidney for what he supposed to be tuberculosis, but which proved to be nephritis. In 1900 he did a decapsulation on the remaining kidney to relieve a hematuria that came on shortly after his first operation. Three years later he did a nephrotomy for pain, eight months after which the patient, who was a nurse, reported herself as well. The different procedures probably all act in the same manner so far as affecting the bleeding goes; that is by decreasing intracapsular tension for a sufficient time to allow clot formation and subsequent cicatrization of the bleeding points.

CONCLUSIONS.

One may see in cases of chronic nephritis renal hematurias. Some are slight, others produce great debility by their long duration, or even threaten life by their profuseness. To this class, probably belong many of the so-called "essential renal hematurias." These hematurias may have as their underlying cause, a nephritis of either toxic or infectious origin. A nephritis of infecitous origin is unlike a toxic nephritis, in that it may be limited to one kidney or part of it. Though many cases do not give a distinctive clinical picture, a diagnosis can probably be made in a considerable proportion of them. A recognition of the hematuria of chronic nephritis is important that the condition may not be confused with a more serious renal lesion, and a kidney be unnecessarily sacrificed.

Under operative treatment, a considerable proportion of these cases have recovered. Our knowledge of the condition is not sufficient to allow one to formulate definite rules as to the best operative procedure in each instance. There are not at present a sufficient number of carefully reported cases to allow one to compile useful statistics. Careful observation of similar cases as they arise, combined with a thorough bacteriological study of the urine, as well as of the microscopic pathology of the kidney, will doubtless do much to clear up many points that are at present in doubt.

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A CASE OF RENAL CALCULI DEVELOPING THE STONE-PASSING HABIT.[1]

By S. L. ELSNER, M. D., Rochester, N. Y.

THIS patient, a woman of about thirty, first came under my observation in February of 1903. Nothing noteworthy in her family history, except that one cousin on her mother's side, at the age of twenty-five, passed a large number of renal calculi. Her personal history revealed the fact that she menstruated at about eleven, fairly regular, but suffered from dysmenorrhoea, and as she grew into womanhood would occasionally have pains in her sides, independent of menstruation. There is a vague history of albuminuria with her first pregnancy, this offspring being stillborn. Her next lived but a short time. She had kidney trouble during this gestation and after for a time. Her third pregnancy was attended by no mishap and the child is living, aged about six months.

About three years ago she was treated for a short period for an indefinite intestinal neuralgia (the attending physician recently told me that he suspected gravel at the time, and also was puzzled to observe that it took at times 2 grs. of morphia hypodermically to give her any relief). She presented herself with symptoms of an endometritis. Examination at this time showed no other trouble. Her urine was negative. I made a curettage on February 15, 1903. Discharged her in about ten days, free from all symptoms. About two weeks later I was called to her for abdominal pain. Examination was negative and I presumed she was about to menstruate, which I think she did a few days later. I saw her next, April 3, 1903, when I received the first intimation of symptoms due to renal colic. She had typical pain along the right ureter, and within the 24 hours passed her first small calculus. Her urine at this time was negative aside from its being markedly acid with uric acid crystals and amorphous urates.

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[1] Read at the Annual Meeting of the American Urological Association, Boston, June, 4-5, 1906.

During the next week she passed several calculi. The pain, however, was on both sides. Up to the taking of the first X-ray, just three weeks from the beginning of colics, she had passed about 15 calculi. A radiograph was made by Dr. Clarence Greenleaf, who was at that time assisting the late Dr. Lewis Weigel, and was negative. From the 24th to the 29th of April, she had frequent colics, but no calculi were passed. During this four or five days the urine was scanty. The catheter was used, giving at one time 24 ounces after 39 hours' retention, and at another 24 ounces after 52 hours' retention. On the last day she passed 4 calculi, followed by a large amount of urine in the next 24 hours, pain having been referred to both sides. The next day the colic was in the left side. One pint of urine was passed in 20 hours. Two calculi followed with this colic. Two days later she had pain in the right side, but passed no stone. During this time I catheterized the ureters. The bladder wall looked healthy. The ureteral openings, however, were large, the left much the larger, that being the side from which the last two stones came. The right catheter passed to the brim only. The left catheter was held up at about 2½ inches from the ureteral orifice. The examination of the urine showed nothing abnormal, aside from the uric acid crystals reported before by Dr. S. H. Rosenthal. In the next few days several calculi apparently from the right side were passed. This was followed by a severe left side colic, and on this day I gave her a large dose of morphia and took her to Dr. Greenleaf's office for another radiograph. I passed a catheter with stillette up the left ureter. It stuck again at about 2½ inches above the orifice. I got a look at the right orifice which again was smaller than its fellow, but the patient refused to wait longer for the catheterization of this side. The X-ray was taken and Dr. Greenleaf's report follows:

"A pouch of calculi in left ureter, just at the end of the catheter. A probable bunch of calculi in left pelvis with the kidney displaced outward. The right side shows course of ureter to brim. No stones positive, but a shadow just above brim and again in the region of the kidney." This report agrees with the information gained by the catheterization made on May 3. On reaching home after the radiograph was made, she had a most severe colic, referred entirely to the left side, and during the next three days, passed several stones. During this period she had to be kept under chloroform and morphia most of the time.

The next colic was on the right side, May 16, and she passed 7 calculi during the 24 hours. An operation on either side was refused, the patient and her husband feeling that she would finally empty her kidneys. This I agreed to readily, since she certainly was passing them at a great speed.

She was put on a diet, urotropine and water liberally given. During the latter half of May, she was in almost daily colics, passing at least 30 calculi from right side and 60 calculi from left side. In June she continued with the right side colics, which began the last week in May and passed a large number from this side, some of them, very soft; most of them were hard, however. During this month a nurse was in constant attendance, and we were quite satisfied that the left side had emptied and all the calculi were coming from the right.

Operation was refused again for the same reason as stated above. In July she suffered intensely, some of the colics not lettng up for a week at a time, as, for instance, a colic termed in my case book as "Six Day Colic," from July 9 to 15, was accompanied by almost constant pain in the right side, resulting finally in the passing of two calculi, one almost a perfect cube with sharp edges. In spite of 7½ grs. morphia and chloroform administered in the 24 hours, the pain continued until the next day, when two more soft, medium-sized stones were passed. This was followed by relief and a good flow of urine. During many such colics, the bladder with catheterized and little or no urine was found. Hot water was injected through the catheter to fill the bladder, the catheter removed, and the patient would expel the water without a stone. This procedure seemed to give her relief and at times apparently hasten the birth of the calculus.

At this time an examination of two of the calculi was made by Dr. Ira S. Wile. He was at that time a resident of our city, but soon after took up his work in New York City, where he has been connected with the histological and pathological laboratories of Columbia, and is doing like work at Mt. Sinai Hospital.

His report of one small and one fairly large calculus was sent to Prof. Herbert R. Moody, Department of Chemistry, Hobart College, and there mislaid, but a recent letter from Dr. Wile is self-explanatory.

" In answer to your letter of the 14th, I can say that I well remember the case in question. Unfortunately in moving from Rochester, my records were sadly mixed, and I am unable to find the report on the calculi in question. There were two given me for examination, one small, one fairly large. The stones were both of mixed type, responded to the murexide test. Urates were present, but I do not recall which ones. The structure was laminated and examination of different layers showed calcium oxalate and phosphates to be present. Further than this I regret to say I can give no report."

In August she went through much the same performance with all pain on the right side. At the end of this month she was taken with most severe colic yet recorded, beginning on the 29th and lasting to September 4th, and resulting in the passage of a 26-grain stone. The next day a 22-grain stone followed. She now seemed anxious enough for an operation, but her general condition would not warrant same. During this month her colics continued less severe and her general condition improved, the pain remaining in the right side up to the 25th. During the last five days of September, it was apparent that she had pain in both sides. The reasons for such a conclusion are apparent from the following notes:

September 26. Colic again this morning, uncertain about side. Visit by Dr. Rosenthal in the afternoon. Passed medium-sized stone while there.

September 27. Colic on right side, still tender on left.

September 28. Visit in A. M., colic on both sides. Visit at 5 P. M., passed a small stone with relief in right side. Pain in left side continued one-half hour, when she passed the second stone with relief on left side.

September 29. A. M., severe colic in both sides. Passed one small stone with relief on left side. Pain continued on right side, visit from 10 to 11 P. M., passed stone with relief.

September 30. Pain right side, gave 1½ grs. morphia. Radiograph taken. Two exposures, 8 to 10 minutes. Both resulted in poor negatives.

On October 5 she consented to enter the Rochester City Hospital for further X-ray and operation. She did not remain, however, because the negative showed only slight trouble in right side. She promised to return if it seemed necessary. During the next month her pain was mostly in the right side, but fearful of an operation would at times deny any pain. Her morphia was cut down and she was allowed to suffer till she consented to be moved to St. Mary's Hospital early on November 30.

Operation the same day, at 10:45 A. M. Anaesthesia, chloroform, followed by ether, assisted by Dr. Rosenthal and house staff. The right kidney was readily exposed and easily brought up into the wound. The organ was not much enlarged, its surface was studded with old cicatrices resembling old cysts. The ureter vessels and pelvis were easily exposed, the latter was dilated. The walls of the ureter were thin. No calculi could be felt. The kidney was next incised on the convex surface of cortex, just inside of center, and laid open like a book. Bleeding was easily controlled by finger pressure below. No calculi found in body or pelvis. A probe was passed down the ureter only as far as I could see and feel, since I feared that I might perforate its thin wall. I put a rubber drain into the pelvis, sewed the kidney with deep and superficial catgut sutures, fastened organ to fascia, drained with gauze down to and below pelvis, and closed each layer around drain. She was filled with salt solution, both by rectum and skin for its stimulating and diuretic effect.

December 1. Did not sleep, but condition good, passed 24 ounces of urine almost clear from blood. She had some cough, with fine rales. Temp. 100 to 100.8°, pulse 90. By the third day her lungs were clear, temp. 99°, pulse 84, and she was free from pain and remained so until the evening of the fifth day, when she had a sharp colic, said pain was in right side, and passed a small calculus. She was again comfortable until the seventh day. Her sutures were removed and that night had a colic, passing a second small calculus early on the eighth day, with pain referred to the right side. On the ninth had a slight colic, no stone. She sat up on the eleventh day for one-half hour, no pain. The fourteenth day had diarrhoea, but no colic. On that night again had colic on right, and passed another small stone on the morning of the 15th. She now insisted on being taken to her home and was discharged from the hospital in a nervous state. On the 24th day she passed her fourth stone. The fifth followed on the 29th day. On the 33d, her sixth. On the 34th day, January 3, 1904, she was feeling fairly well and advantage was taken of this, and so I catheterized her ureters with wax-tipped probes. The left orifice again appeared the larger. Probes were passed 15 inches on the right side, 13½ inches on the left. There were no markings other than were made by the instrument. The conclusion we had to come to was that she had emptied her right side, and the pain must be referred from the left kidney. Advised operation upon this side which was refused, the patient claiming that if the right side had emptied itself, the left would do likewise, and she would wait. The husband added his strong argument that radiography in uric acid stones was unreliable, and surgical procedures had thus far failed.

She went on through January, 1904, with right-sided colics. In February and March they varied from right to left, and both sides as before recorded. In April, they were left-sided. On the 2d of May I again got consent to take a look into the bladder. She had passed 4 calculi during the day and naturally was quiet with her usual amount of morphia. I got the cystoscope into the bladder, saw its walls looking remarkably well, the right ureteral opening normal in appearance and was about to catheterize the large, swollen left orifice when the lamp burned out and she refused further examination. From this to June 15, much the same pain, mostly in the left side. In one of these colics, May 28, she passed two small calculi and 100 pieces counted.

From June 15 to July 18, 1904, for a period of about five weeks, this patient was in almost constant pain, getting rest only when saturated with chloroform and morphia. Her general condition was alarming, and she retained very little nourishment.

The amount of urine varied from 8 to 32 ounces in 24 hours, the latter amount only once. She could not leave her bed, a nurse was in constant attendance, and during this period, July 6, I made a hurried cystoscopic examination at an opportune moment. This revealed the same puffy and edematous left ureteral orifice, with a congested area of fully ½-inch about the opening. No stone was seen in the bladder, the wall of which looked well and the right orifice normal. At times she was relieved a little by filling the bladder with hot water, but no stone appeared until the expiration of this period, when after 24 hours of the greatest suffering and agony I have ever witnessed, she gave birth to a stone which my notes states was not as large as some passed, but the surfaces were blackened with a little extra deposit on facets, showing retention en route. Fifteen minutes later a second smaller, but similar stone was passed without relief. A third and fourth followed the next day, all of them facetted. She then went on as usual with daily colics, the pain starting high up the left ureter and the calculi that followed were not facetted.

Now she again promised to permit an operation, if she were not soon relieved, but refused later. Taking her morphia away did no good. A few more cystoscopic examinations showing the same condition of affairs were of no avail in getting her consent.

The swallowing of a pin, an attack or two of dysmenorrhoea, a frightful and prolonged attack of colliquative diarrhoea and a neuralgia of the face, following a tooth extraction, were a few of the many things this patient nursed in order to gain time and try my patience to January, 1905. I again cut out her morphia and refused medical treatment to which she finally succumbed.

On January 22, I had her nurse prepare her at home. She was sent to St. Mary's Hospital the morning of the 23d, where I operated her at 10:30 A. M. A few moments were taken in passing the catheters into both ureters, letting them curl up in the pelvices. I noted a fairly healthy condition of the bladder, except the area about the left orifice before described. I then exposed the left kidney through the usual lumbar incision, easily delivering it on her back. Palpation was negative, and the surface did not look unhealthy, although the organ was larger than its fellow. I opened through the convex cortex as before, found pelvis somewhat dilated, the catheter in sight, but no calculi.

I drained and sutured the kidney, provided for stay sutures into fascia and enlarged the incision downward and inward, so as to expose the ureter to the brim. The ureter was as large as a lead pencil, and not thin-walled like its fellow. Not finding anything, I closed the wound, after providing drainage to post peritoneal space. I then turned her over and opened the abdomen in the median line. I now had the bladder filled so as to well distend it. This enabled me to examine its entire surface thoroughly, and thus exclude diverticuli and adhesions to the neighboring gut. On letting the water out, I was able to palpate both ureters with a catheter as a guide, from base of bladder to the pelvices. This completed my duty and I was convinced that for a time at least, I had been well faked. All the calculi available from her home and my office were now sent to Samuel A. Lattimore, Professor of Chemistry, University of Rochester, for analysis. At the end of 30 hours the patient insisted that she had pain in her bladder, refused to be catheterized, and deliberately got out of bed, sat on the commode and passed urine containing two calculi. On the 4th day the urine was free and contained a few blood cells only. All sutures were removed at the end of the 6th day, and on the 7th day she insisted on being removed to her home. A nurse was sent with her with instructions to limit her morphia to ½ gr. in 24 hours.

By the 12th day she was getting ⅛ gr. every 24 to 36 hours. The tube was removed on the 14th day and packing used thereafter. She ran an irregular fever for another week. On the 30th day she began a scheme to discharge her nurse. No morphia had been given for 48 hours.

On the 35th day she had been five days without any morphia and that ended the nurse. Within three days she passed a calculus, followed the next day by another. Morphia was withheld. She could never keep a dose down by mouth, so that if she had any it was per rectum. This was my last chance to get a look at her ureteral orifices, so I arranged with her husband to chloroform her in her next pain, and on the 7th of March, 43 days since her first stone, and four days after her last, I accomplished my purpose.

I catheterized her bladder, preserving the urine, then with the cystoscope I made an inspection of both the ureteral orifices, and found them normal for the first time. I put a catheter into the right kidney and allowed it to remain until she recovered from anaesthesia. Examination of both these urines was negative.

In the meantime I had a report from Prof. Lattimore that out of 3 grains taken from 4 different calculi, he found 2.36 grains or 78.6 per cent, silica, and that the fine stuff and sand passed was of the same composition.

Prof. R. H. Moody of Hobart College sent me a report which checked Prof. Lattimore, varying only .3 per cent., he finding 78.3 per cent. pure silica, stating that the other constituents were principally iron and lime.

I now ceased my regular visits, the patient subsequently influenced her husband to let her use the hypodermic, and from that time to this I have only knowledge of one calculus passed. One-half of this was given me and Dr. Lattimore found that it consisted mainly of cotton fibre, wool fibre and mouse hair.

Of course this patient denies ever having put anything into her bladder, and asks a question as to how she could get the fine stuff into her body by answering it herself, " Perhaps you think I blow it in! "

It certainly is remarkable that this patient is living and now apparently healthy looking. It is almost inconceivable that she at no time infected her bladder and suffered no infection after two such serious operations.

Knowing of the ability and veracity of Dr. Ira Wile, who made the examinations of the early calculi passed in this case; recalling the second radiograph showing positive shadow at the end of left catheter, probable shadow in kidney of same side, a shadow above the pelvic brim, and in the kidney of the other side; considering the findings on exposing both kidneys, pelvices and ureters, again feeling positive that her object in faking was to get the morphia or chloroform, it is improbable that she would suffer eight months, that being the period up to her first operation, without supplying herself or influencing her husband to supply her with a hypodermic syringe.

I must conclude, therefore, that at least from the beginning of her trouble and up to and a short time before she had the last radiograph, which showed a shadow in her right kidney, a period of six or seven months, this patient passed renal calculi. If she passed any renal calculi after this she must have done so, as was suggested by a well-known X-rayist, by rapidly forming them in her kidneys. If it had not been my good fortune to make the last cystoscopic examination, after a bladder rest of practically 40 days, and finding both ureteral openings contracted and normal in appearance, it would be impossible for me to explain the persistence of the dilated and swollen ureteral orifice. This, I conclude, was due to the frightful, prolonged and frequent contractions of the bladder wall. In order that you may get a still more accurate conception of the magnitude of my troubles with this patient, I have had my assistant, Dr. John C. O'Connor, draw off the following record from my case books:

No. of colics on R. S	217
No. of colics on L. S	188
Total	405

No. of stones from R. S	299
No. of stones from L. S	219
Total	518

Stones classified as follows:

Small stones	415
Medium-sized stones	43
Large-sized stones	60
	518

Numerous attacks of pain not characterized as actual colic; or pain where colic was suspected, but was denied by patient, are not included among the colics in above report.

Not included in the total of stones are 200 or 300 small pieces and a considerable amount of fine sand.

Report includes that period from April 3, 1903, up to and through second operation, January 23, 1905.

URETHRAL HEMORRHAGE.[1]

By
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BLEEDING from the urethra is, to the male a source of alarm quite out of proportion to its immediate dangers. The female, however, being accustomed from the beginning of womanhood to the periodical appearance of blood at the genitalia, is not disturbed thereby (Posner).

That part of literature which has been examined shows no mortality from urethral hemorrhage. A fatal outcome is, however, conceivable in severe injury by badly managed instruments, in external traumatism crushing the urethra, in deep erosion produced by rough stones, in malignant disease.

Bleeding from the urethra may proceed to such a degree as to exhaust the patient. Oberlaender[2] reports two such cases. Each had a moderately thick stricture in the region of the bulb. Urethral hemorrhage followed coitus. In the first case, the bleeding continued for three weeks, rendering the patient quite anemic; the second patient bled for eight days. In each one the hemorrhage stopped after a single dilatation of his stricture.

A similar but much more aggravated case of urethral bleeding following coitus is recorded by Kofman in "Zur Tamponade der Urethra" (*Centralblatt der Chirurgie,* No. 10, 1899). It has been extensively excerpted elsewhere.[3]

The sources of urethral bleeding are not always readily determinable. As an essential aid to their study we must seek the site or sites whence the bleeding comes.

I. Hemorrhage from the Anterior Urethra: Blood appears at the meatus, or oozes or streams therefrom when the flow is extensive. It may also drip from the meatus after urination. The latter manifestation is usually not associated with pain, and the blood is not forcibly ejected by the detrusors; it is thus differentiable from the terminal bleeding of posterior urethritis.

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[1] Presented before the American Urological Association (Second Section), December 12, 1906.

[2] Oberlaender und Kollmann. *Die chronische Gonorrhoe der männlichen Harnröhre.* Teil III, s. 66. Thieme, Leipzig, 1905.

[3] The Irrigation Treatment of Gonorrhoea; its Local Complications and Sequelæ. P. 77. Wm. Wood & Co., New York.

When the anterior urethra bleeds, the first part of the urine passed may be bloody; the second part may be clear, and the last part blood-stained or clear, in accord with the amount of bleeding.

External traumatisms may produce very copious bleeding from the anterior urethra. Most of these are self-inflicted. Among them may be cited the barbarism of "breaking a chordee." This is done by laying the tensely curved penis on a table and striking it with a heavy book. Another similar brutality is in violently forcing down a window-sash upon the penis as it rests upon the base. Both are followed by most copious hemorrhage. In one patient seen some twenty years ago, the anterior half of the penis was almost entirely crushed off by a window-sash so employed.

Guyon reports several cases of fracture of the penis by a "*faux-pas du coit.*" Such a patient was brought to us by Dr. Wm. Rosensohn of East Orange, New Jersey. He was an Italian aged thirty-five. Three years prior to the consultation, while driving in a buggy with a young woman not his wife, he attempted to cohabit with her. His not unwilling partner was kneeling astride of him and, according to his description, reciprocated in a violent pelvic motion forward. The tensely erect penis struck some part of the pubis; excruciating pain followed with copious hemorrhage which lasted 7 days.

Traumatisms by bougies, sounds and dilators, have grown steadily rarer during the past twelve or fifteen years. In personal practice no case resulting in noteworthy bleeding has been brought for consultation since 1904. This evidences the extent of the average general practitioner's conversion to the need of exceeding gentleness in the use of dilating instruments. For some inscrutable reason it is not yet generally accepted that the same gentleness should be practiced in the use of catheters, as will be mentioned later on.

It may be purely casual that recently no cases of injury to the uretha by dilating instruments have been seen in personal experience. At all events, it seems wise that none of us tire of admonishing our younger colleagues of the need of extremely cautious urethral instrumentation. This is especially urgent when filiforms are employed. Equally does it apply when the progress with dilators seems slow, as has been emphasized in another paper.[4]

The Treatment of bleeding from the anterior urethra, is naturally predicated upon its cause, its quantity and its persistence.

Foreign bodies, whether descended from the bladder or introduced from without, must be removed, before any other treatment can be considered.

Papillomata, in former days, were a fairly frequent cause of urethral bleeding. Since the wider adoption of irrigations and dilatations in acute and chronic gonorrhea, these growths have become exceptional. When they do occur, the most satisfactory manner of removing them, is by Oberlaender and Kollmann's method.[5] Its description is here condensed:

1. Use an urethroscopic tube without the Kollmann bevelled edge, and of the largest size that will readily enter the urethra.
2. Extend the penis to its fullest length to smooth out its folds.
3. Place the edge of the tube at the site of the largest growth that can be reached.
4. Dust the growths with powdered resorcin, 1 part, to 9 parts powdered gum arabic.
5. Hold the tube and penis firmly while the light-carrier is removed, and throughout the procedures that follow.
6. Take two applicators so armed with cotton that they will snugly traverse the tube.
7. When the applicators have reached the bottom of the tube, withdraw the latter slightly.
8. Move the applicators, together with the tube, up and down, to the right and left through the zone of the growths.
9. After removal of the applicators, dust the growths again with the resorcin and gum arabic mentioned above (4).

The surfaces of the growths are thus destroyed and their bases loosened. It may be necessary to repeat the procedure at intervals of 3 to 6 days, until the papillomata are entirely removed.

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[4] "Urethral Dilatations with Expansible Instruments." *American Journal of Surgery,* January and February, 1906.

[5] *Op. cit.* Teil IV. p. 90.

When the papillomata are isolated, or occupy but small groups, their removal is more simply accomplished by cutting them off with the sharp edge of the urethroscopic tube thrust through their bases.

If this method fails, the growths may be removed by means of Grünfeld's cold snare or Dittle's or Guyon's endo-urethral forceps.

Persistent stumps remaining after the above procedure, may be destroyed by the galvano-caustic point.

Sexual intercourse or intense sexual excitement may cause hemorrhage from the anterior urethra, especially in a patient with chronic urethritis.

When such bleeding occurs, it must be treated by rest, opium, camphor monobromate, and compression of the urethra. Ice, locally, may prove useful, but usually requires relatively very long application to permanently arrest the bleeding.

Compression of the urethra is accomplished in various ways:

1, by splinting, which consists in bandaging a wooden finger-splint or tongue-depressor to the dorsum and another to the inferior surface of the penis;

2, by bandaging without splints;

3, by bandaging the penis, whose urethra contains a catheter;

4, by packing the urethra.

Each of these methods presents self-evident objections. No objections have developed in the plan used by the authors since several years, which has quickly and permanently arrested all hemorrhages of the anterior urethra. To embrace its technique in a term, it has been perhaps somewhat clumsily designated

5, *External catheter compression.* It consists in laying a soft rubber catheter with rather thick walls along the scrotal raphé and the lower aspect of the penis. With a ¾ inch gauze roller, whose first turns are made at the peno-scrotal juncture, the catheter is firmly bandaged between the corpora cavernosa penis, so as to press upon the urethra throughout the pendulous portion. The bleeding ceases in a very few moments and the dressing, left *in situ* for from 10 to 30 minutes according to the severity of the bleeding, produces no untoward effects. The bandage is then slowly removed and if the bleeding is not entirely arrested, it is replaced with only as much pressure as is needed to stop all oozing from the meatus. Even if left so bandaged for several hours, no material discomfort is experienced.

II. Hemorrhage from the posterior urethra, is usually associated with pain at the end of urination and for a variable while thereafter. Blood may be admixed to the last portion of the urine and may drip or be forced from the meatus when the act is finished. It never escapes independently of urination, except when it has been previously forced into the bladder (IV).

In this connection it may be interesting to record an incident which occurred but once in the writers' experience. A patient with chronic gonorrhea had never bled from the urethra. On voiding urine at his preliminary examination, he emptied about 90 cc. of somewhat turbid urine into the first tube; on interrupting the stream to use the second tube, he ejected about 3 cc. of fresh blood; the remainder of his urine, passed into the third tube, was clear. No pain accompanied the abrupt use of the cut-off muscle; subsequent urethroscopy showed no lesion that could account for the sudden bleeding and the patient never bled thereafter.

Bleedings from the posterior urethra are far more frequent than hemorrhage from the anterior part of the channel. The greater delicacy of the posterior urethral mucosa and the relatively unyielding character of its tissues, as well as its anatomical relations, present sufficient explanation therefor.

Such bleedings may uninterruptedly or spasmodically continue for weeks. They may simulate hemorrhage from the bladder (*q. v. infra*).

Tubercular bleeding. In the absence of gonorrhea, persistent terminal bleeding, especially when associated with slight pain and frequency of urination, should direct the mind to the possibility of tubercular invasion of the posterior urethra. Exploratory instrumentation then will be justifiable only when microscopy of the extruded bloody urine, and guinea-pig inoculation, have proven the absence of tuberculosis.

The Treatment of posterior urethral bleedings will be considered together with that of the subsequent division of the subject.

III. Hemorrhage from both urethrae may, like the other urethral bleedings, be caused by pathological conditions or by internal or external traumatism. The most frequent of these are in peracute gonorrhea and the injuries done by forcible or excessively frequent or excessively strong injections, or violently administered irrigations.

Peracute gonorrhea with bleeding is, for some unexplained reason, called "Russian clap." It begins abruptly and follows a vicious course. This discharge is brownish or red, according to the amount of blood it contains and ranges in consistency from that of a thin, serous liquid to that of thick cream. It generally presents itself in ill-nourished individuals or those whose resistance is reduced by alcoholic or other dissipation.

The Treatment of this hemorrhagic form of gonorrhea is by irrigations, most cautiously administered; in rest and all the restrictions elsewhere detailed.[6]

Strong Injections. Even those who make no claim to specialism in venerology, often have to dissuade patients from the quest for "strong injections to cure the clap quickly." Many such patients, if they do not succeed in obtaining the *strong* injections from a regular practitioner, will have recourse to the quacks or counter-prescribing druggists. Some, imbued with false conceptions, will use injections with undue frequency or with violence. The condition of the urethra being favorable thereto, capillary hemorrhage can result from either of these procedures. The sequelae of gonorrhea, which would be averted by carefully administered irrigations, are thus invited.

In personal practice the various forms of "P syringe" have been relegated to such small injections as are used in cocainization before urethrotomy or to inject a medicament for analgesia lubrication.

Violent Irrigations. Although the use of the irrigator in urethral and vesical diseases has long since passed the experimental stage, there are still some excellent men in the profession, who remain misguided by *a priori* reasoning in regard thereto. These, in their teachings at least, condemn irrigations on the ground that they may lead to complications and may directly produce severe urethral hemorrhage. Their attitude in this regard is precisely as illogical as it would be to condemn appendectomy or any other accepted operation, because an unskilled, clumsy or ignorant aggressor, invading the domain of the experienced operator, causes a patient's death.

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[6] "Advice to Gonorrhœal Patients." *Philadelphia Medical Journal,* July 8, 1899.

Like all surgical procedures, irrigations entail *suaviter in modo*. The least employment of force in lieu of gentleness and patience, invites the very conditions and accidents that irrigations are intended to avoid. Among these, the one most likely to immediately occur, is hemorrhage.

It seems singular that this matter is relatively so little heeded. There appears to prevail, among an unfortunately large number in the profession, an inexplicably unconquerable defiance of this absolutely necessary and self-evident rule. It has been repeated in books, in papers and discussions; it has been emphasized by the teachings of eminent authorities and yet every genito-urinary specialist is frequently called in consultation regarding urethral hemorrhage from violently administered irrigations.

The technique of urethral and intravesical irrigation, has been so often and so fully described [7] that its repetition here could not even add emphasis by reiteration. Moreover, it seems well understood, except as to the force to be employed. To aid in preventing urethral hemorrhage, which need never occur, we repeat here that to place the irrigator's receptacle more than 4 feet above the level of the chair on which the patient sits, is *never* justifiable.

The compressor cannot be overcome by force; it can always be coaxed, never compelled, to yield. To endeavor to violently conquer it is to endanger the patient's urethra, with all that this portends in consequence.

We not infrequently learn that a practitioner with more zeal than judgment, has raised the percolator to the ceiling of his office, to obtain all the hydrostatic pressure possible. The bleeding that primarily results is the only reward for his misdirected energy.

IV. Hemorrhage from the posterior urethra into the bladder: With the relative strength of the sphincter vesicae and that of the compressor urethrae kept in mind, the mechanism of bleeding into the bladder is readily comprehensible. In the intervals between urinations, bleeding into the posterior urethra is held back by the strong compressor; the feeble bundle of fibers constituting the sphincter vesicæ, being in the direction of minor resistance, yields and thus admits the extruded blood into the bladder. It may then be discharged evenly mixed with urine at the next voiding of that viscus, or may be carried by the urine as more or less long clots which promptly drop to the bottom of the vessel receiving them. These clots are irregularly flat, of unsymmetrical breadth and thickness; they have lumps in part; in these regards they differ from the worm-like clots that often come from a bleeding ureter. When the posterior urethra bleeds into the bladder, the end of urination is usually painless. But pain may follow the act, with the "*coup-de-piston*" as the detrusors strive to eject the final drops which then are likely to be of pure blood.

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[7] "The Irrigation Treatment of Gonorrhœa," cited in foot-note 2.

When the symptoms do not clearly indicate whether the blood proceeds from the posterior urethra or the bladder, cystoscopy is necessary to decide the question. If by means of it the bladder-wall and the ureters show no bleeding, the source must be sought by posterior urethroscopy. The presence of papillomata in the posterior urethra then often explains the origin of the blood. In most cases, however, the sodden, macerated mucosa of posterior urethritis with erosions, proves to be the cause.

The Treatment of posterior urethral bleeding, when not tubercular, is naturally divisible into its causes.

When it is due to acute posterior gonorrhea, it generally yields to one hot intravesical irrigation.

When bleeding is due to instrumental traumatism, the perineal crutch may be necessary to arrest it.

When papillomata bleeding into the posterior urethra are the cause, they must be removed through the urethroscope.

The general treatment outlined for anterior urethral bleeding applies equally here.

It has been noted that all efforts to arrest bleeding from the anterior urethra by injections of suprarenal extract have failed in personal experience. These failures do not occur in all cases of posterior urethral hemorrhage, as will be mentioned in connection therewith.

Hemorrhage from improper instrumentation, though touched upon before, is sufficiently dangerous and frequent to merit further study in a separate division of the subject.

Most frequently, ruthless catheterism is at fault. Any part of the urethra may be injured thereby, and serious, even fatal bleeding result.

Injury to the urethra by instruments is never necessary. It never would occur, if catheterism were regarded by all as a capital surgical operation. Its technique has been fully detailed by every one of the authorities, and was also discussed in a little paper presented before this Association's Second Annual Meeting.[8]

The prostatic region is more frequently injured by violent catheterism than any other. If then the blood escapes through the urethra, the condition is not as grave as when it is poured into the bladder. The latter occurrence is the more frequent, and offers greater peril to life.

The Treatment of prostatic hemorrhage. If the injury and consequent bleeding are slight, ice-suppositories, vegetable astringents (acid tannic., acid gallic.) may suffice. Inorganic (metallic) astringents are dangerous, not only because of their escharotic character, but also because of the tough, hard mixtures with the blood which they produce. The flow of blood bladderwards may carry these with it and thus increase the difficulties and dangers that present. Even when this does not occur, the artificial coagulum produced upon the wound is but superficial and may not at all arrest deeper bleeding.

Suprarenal extract may, in slight injuries to the prostatic region, arrest the bleeding. The profound local anemia produced, however, delays healing.

Evacuation of the clots formed in the bladder is needed, primarily. This is best accomplished with the litholapaxy catheter, using the Guyon syringe as an aspirator. When the clots are not large, they may be removed by the Bigelow evacuator.

The permanent catheter must inevitably follow for the sake of vesical drainage as well as for the pressure it exercises upon the bleeding prostatic portion.

In employing the means indicated, the operator must be prepared for capital intervention, which may at any moment become imperative. In such a case the operation of choice will be

Perineal section, with a large tube for drainage and gauze firmly packed around the tube.

In order to render this sketch as complete as possible within the necessary time-limit, several conditions will be submitted that may simulate urethral bleeding.

1. *Hemorrhage from the bladder-walls,* when very copious,

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[8] "Vesical Retention of Urine." *Medical News,* June 18, 1904.

may send blood through the urethra to the meatus before, with, and after the urine, but not independently of urination. The macroscopic appearance of the urine will, moreover, aid in preventing error of diagnosis.

Vesical bleeding, when not due to external traumatism, may be intermittent. It usually then renders the entire urine bloody. At times the urine may look merely smoky and at others have a dark red, brown, or even black tint. At intervals, perfectly clear urine may be passed.

Vesical hemorrhage is exceptional in gonorrhea, but frequent in tubercular invasion, benign and malignant tumors, or foreign bodies (such as stone, broken catheters, or articles inserted into the bladder, or forced in by crushing of the pelvis).

Vesical bleeding occasionally leads to occlusion of the internal meatus by clots, demanding catheterism and sometimes aspiration to relieve the consequent retention (*vide supra,* "Evacuation of Clots").

Consideration of this fact necessitates a momentary divergence from the subject in hand, to touch upon differential diagnosis.

If blood escapes from the catheter, it is probably due to material injury. The catheter's tip may then be in a false passage, and not in the bladder at all. If the first few drops of urine drawn by the catheter come forth blood-stained, and the volume of urine that follows is clear, the origin of the blood is in small traumatisms produced by the instrument. In such a case the catheter's eye, after withdrawal, may emit a few additional drops of bloody urine and its point may have adherent several small coagula. Minor instrumental injuries are frequent in chronic urethritis and almost invariably cease at once. Occasionally it happens that one or two urinations after instrumentation are blood-tinged.

Blood coming from a carefully introduced catheter may originate in a hemorrhagic or non-hemorrhagic cystitis, may be traceable to a maceration of the tissues covering an hypertrophied prostate, or have its cause in the presence of a foreign body. More frequently, however, it will be found to be due to tubercular invasion of the bladder. Vesical papillomata, if large, may bleed so very freely, as to demand immediate cystotomy, removal of the growth and destruction of the bases with the Pacquelin cautery. When a papilloma is not very large, it may be snared from the bladder-wall by means of the Nitze, the Casper or other operating cystoscope.

The precise localization of a vesical hemorrhage is generally possible with the cystoscope.

2. *Hemorrhage from the upper urinary organs* has, in personal experience never been so copious as to simulate bleeding from the urethra.

3. *Hemorrhage from the genital adnexa* may cause confusion by the blood escaping into the posterior urethra and possibly thence into the bladder. It is then emptied with the urine and when the bleeding is very rècent and copious, it may also follow the urinary stream.

Bleeding from the seminal vesicles, the vasa, the epididymes, the testicles, give the semen a reddish or brown appearance and in some instances may be perceived as post-coital hemorrhage by the patient.

Bleedings from the ejaculatory ducts show fresh blood mixed with normal or slightly blood-tinted semen.

The chemical reactions recommended to determine the presence of blood in the urine, are valuable for this purpose only. A patient from whose meatus blood escapes, and who passes partially or entirely bloody urine, may be bleeding from two or more constituents of the urinary apparatus. Chemical tests for blood in the urine, are then of no practical value.

Microscopic urinalysis, however, should never be omitted when blood comes from the urethra or is mixed with the urine. Heitzmann[9] has shown in innumerable instances that the source of bleeding can be located by the preponderance of epithelia from the affected region or regions. A case reported last year before this Association by Bierhoff well illustrates the value of microscopic urinalysis in the conditions under consideration. His patient was bleeding. He sent a specimen of the urine to Heitzmann who, with no information about the case, reported that the epithelia present showed the blood to be due to a concretion in the bladder near one of the ureteral mouths. Cystoscopy by Bierhoff verified the diagnosis. Citations of similar confirmations from an enormous number of personal experiences, would unnecessarily encumber this effort.

[9] Louis Heitzmann. "Microscopic Urinalysis." Wm. Wood & Company, New York, 1906.

RÉSUMÉ

I. In hemorrhage from the anterior urethra, blood may appear at the meatus or ooze or stream therefrom or may drip after urination. This bleeding is usually not associated with pain, nor is it forcibly ejected by the detrusors, as it is in the terminal hemorrhage of posterior urethritis.

II. In an anterior urethral bleeding the first urine usually is bloody, the second may be clear, and the last blood-tinted or clear.

III. Anterior urethral hemorrhage may be due to external injury, such as that of " breaking a chordee " or misdirected attempt at coitus.

IV. Anterior urethral bleeding may be produced by internal traumatism, such as badly managed instruments, or other foreign bodies introduced from without or descended from the bladder (stones, broken catheters, etc.)

V. The treatment of anterior urethral bleeding premises removal of foreign bodies or growths if present. If the bleeding does not then spontaneously stop, rest, opium, camphor monobromate and compression must be prescribed.

VI. The easiest and most effective compression is attained by bandaging a soft catheter along the lower surface of the penis, between the corpora cavernosa.

VII. Hemorrhage from the posterior urethra usually begins with the end of urination and follows the act. Blood may be also admixed in the last urine or drip or be forced from the urethra after urination. Posterior urethral bleeding is usually associated with and followed by pain.

VIII. Hemorrhage from both urethrae most frequently occurs in peracute gonorrhea, after violent instrumentation and injudiciously employed injections and irrigations. When due to gonorrhea it must be treated by irrigations, plus rest and according to the other directions usually given.

IX. Hemorrhage from the posterior urethra into the bladder is recognizable by

a, the blood-clots not being worm-like, as they usually are in bleeding from the ureters;

b, the absence of that pain which ordinarily accompanies the end of urination in posterior urethritis, and by the entire urine being bloody, with large clots.

X. Cystoscopy often is necessary to determine whether blood comes from the bladder or posterior urethra.

XI. The macerated lining of posterior urethritis with erosions of the mucosa, and papillomata, are the most frequent causes of posterior urethral bleeding.

XII. In the absence of gonorrhea or of traumatism or of a growth, persistent terminal bleeding with slight pain, may indicate tubercular invasion of the posterior urethra.

XIII. Non-tubercular posterior urethral bleeding,

if due to gonorrhea, generally yields to one hot intravesical irrigation;

if due to traumatism, it may require the perineal crutch;

if due to the presence of a papilloma it must be removed;

if superficial, injections of suprarenal extract may arrest it.

XIV. Important urethral hemorrhage from instrumentation can always be obviated. Catheterism should be treated as a capital surgical intervention. The prostatic region is the one most frequently injured by injudicious catheterism.

XV. The treatment of hemorrhage from the prostatic urethra, when slight, may be limited to ice suppositories into the rectum and the injection of tannic or gallic acid, or of suprarenal extract. Inorganic astringents are inadvisable, because of the hard clots they produce. These may be carried into the bladder and thus further complicate the conditions.

XVI. Any clots found in the bladder must be promptly evacuated, vesical drainage secured by permanent catheterism and if these prove unavailing, perineal section must be performed, and a large tube, firmly packed with gauze, inserted for drainage and pressure.

XVII. Chemical reaction capable of determining the presence of blood does not indicate the source of the bleeding.

XVIII. Microscopic urinalysis should never be omitted in locating the source of bleeding from the genito-urinary apparatus.

EDITORIAL

THE SURGICAL TREATMENT OF NEPHRITIDES

IF we are to accept Pousson's teachings, the advantages of the surgical treatment of acute and chronic nephritis must be evident to any one conversant with the physiology and pathology of the kidney. As surgical treatment is indicated both in acute and chronic nephritis, but for different reasons the advantages offered by operation in each condition should be examined. In acute nephritis it would appear that nephrotomy realizes three fundamental indications for its cure, namely, drainage, removal of congestion and asepsis. It certainly must be admitted that congestion is the initial stage of all nephritides and by splitting the kidney the organ can be bled to any extent, while by the use of the drainage tubes it may be rendered aseptic and in reality this drainage is practically ideal. If the question is raised as to what we render aseptic and what we drain in a tissue having no tendency to suppurate, as is the case in all forms of medical nephritis, it at once becomes evident that the above propositions do not hold good.

Another objection which may be raised is that acute nephritis usually involves both glands and consequently it would seem only logical to do a nephrotomy on each and this very point shows to what extent we are ignorant in renal pathology. However, as time goes on, surgeons have practically shown that acute unilateral nephritis certainly exists and perhaps to a considerable extent, so much so that Weir found it in 17 per cent. of his cases. Then again Lennander believes that a unilateral nephritis is much more frequent than has heretofore been thought and certainly no one can refute this claim. Consequently, it appears evident that frequently only one kidney is involved in the process.

The next question which arises is how to diagnose a unilateral nephritis and here a modern diagnostic triumph comes forward, namely, cystoscopy, segregation of the urine and catheterization of the ureters. Then again it should be recalled that the diseased kidney is frequently spontaneously painful and also increased in size. But now when both kidneys are the seat of acute nephritis a bilateral nephrotomy may be undertaken or if one is not sufficiently surgically inclined, nephrotomy on one organ may be done and according to many writers one will have had the satisfaction to have fulfilled the three fundamental indications of modern surgery, while a supposed reno-renal reflex will attend to the rest. Now all this gives a mortality of about 44 per cent., but it should be pointed out that in the large majority of cases reported so far, the patients were in a desperate condition at the time operation was undertaken and, if they had been operated on earlier, their lives might have been saved, or at least, more successful outcomes would have been certain to have occurred.

Referring now to the surgical treatment of chronic nephritides, we would particularly consider decapsulation as advised and practiced by Edebohls and others. In chronic nephritis, the renal lesion is definite, usually sclerosis has invaded the inter-tubular and inter-glomerular spaces, while the important structures of the organ are compressed and sclerotic, at least as far as the glomerulae are concerned. The only resource offered by therapeutics is a diet allowing sufficient nourishment for the organism and a thorough washing out of the urinary apparatus, but it may be said that chronic nephritis is incurable medically.

Some surgeons at the present uphold that chronic nephritis can be radically cured by nephrotomy, or better still, by renal decapsulation. If the kidney continues its atrophic process the reason is that its retracting capsule compresses it too tightly and if the latter be incised and freed from the renal structures, the kidney will return to its normal condition. They also uphold that the poor irrigation of the kidney is due to the capsule compressing the arteries and if the former be incised not only will the arteries again take on their normal calibre, but a neovascular formation will take place in the kidney, so that irrigation of the organ will be complete.

As may be seen, physiologic pathology is fulfilled by this means, but there are certain objections. In point of fact who has ever seen a profoundly sclerotic tissue return to a normal morphology? We believe that no one has. Then, again, who has seen a neovascularization develop in a kidney after decapsulation?

Tuffier, who thought that this neovascularization might be expected when he was making attempts at renal graft, on the contrary found that there was less vascularization in the newly formed perirenal cicatricial tissue than in the primarily sclerosed capsule, while Claude, in repeating the same experiments, came to the same conclusion.

Now, leaving aside all these *a priori* considerations, if we simply examine the operative results, our last illusions will be destroyed. In the first place those cases of renal decapsulation which have been reported are incomplete and one is obliged to take the word of the writer when a successful outcome is reported. It goes without saying that the good faith of the writer cannot be incriminated, but how can one judge of the seriousness of the cases which they have operated on? There is nothing more difficult than to formulate the prognosis in a case of Bright's disease and say that such and such a patient will live such and such a time; to make such an affirmation the case must have been studied for a long time. Edebohls states that he has had a mortality of 17 per cent., but here again the cases have been given altogether and more detail is necessary.

Not long ago Pippel advised decapsulation in cases of eclampsia. It is quite true that this writer has shown no conclusive fact upon which to uphold his views, for he simply bases his conclusion on pathologic findings, he believing that an examination of kidneys in a laboratory is sufficient to justify his proposition. However, let it be said that still more recently Pousson and Chambrelent have recorded a successful case of operation by nephrotomy in eclampsia.

Evidently one should be skeptical in the case of *a priori* criticisms. However, there is enough evidence at present which tends to show that in properly selected cases benefit may be derived from surgical interference in cases of chronic Bright's disease.

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TUBERCULOSIS OF THE TESTICLE.[1]

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IN discussing tuberculosis of the testicle, there is some danger of grinding out a dull routine of fundamental facts well known to you. In order to avoid this and to throw some light on the many disputed points concerning the occurrence of this inflammation, its progress, and its treatment, these remarks are based to-night upon the histories of 100 patients suffering from tuberculosis of the testicle, collected from the case reports of our office (including cases observed by Drs. Van Buren, Keyes, Sr., and Chetwood). Fifty-three of these patients were observed after involvement of the second testicle had occurred and my material, therefore, consists of 100 patients bearing 153 tubercular testicles.

Predisposing Causes—Family tuberculosis was confessed by 27 patients, denied by 14. It is surely more common than these figures would indicate; yet, as a diagnostic point, very little reliance can be placed upon it, for certain pseudo-tubercular, chronic, gonorrheal inflammations of the epididymis, closely resembling tuberculosis, often occur in persons with tubercular antecedents.

The influence of race and of occupation I am not able to state.

Age at Onset—The following table shows the age at which the tuberculosis localized itself in the testicle, as compared with the age at which tuberculosis was first noted in the patient:

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[1] Read at the N. E. Urological Society, Boston, January 29, 1907.

TUBERCULOSIS BEGAN.		TESTIS BEGAN
In " youth "	5	—
At 9 years	1	1
At 14 years	1	1
Between 15-19 years	9	8
" 20-24 "	17	14
" 25-29 "	24	25
" 30-34 "	20	16
" 35-39 "	4	10
" 40-44 "	7	9
" 45-49 "	7	9
" 50-54 "	1	0
" 55-58 "	2	3
	98	96

In 71% tuberculosis was first observed between the ages of 15 and 34, while in 65% the testis was first attacked between these ages. Inasmuch as it is impossible to regard tuberculosis of the testicle as a separate and distinct lesion apart from tuberculosis elsewhere in the body, and since, as we shall see, the disease may relapse even after years of quiescence, flitting between bone and lung and urinary tract, the date of onset of the tuberculosis is more important than that of its localization in the testis.

Associated Tubercular Lesions—In 49 cases there was no evidence of any previous tuberculosis when the testis first enlarged; while in 36 cases there were more or less ancient foci of the disease elsewhere in the body.

Tuberculosis of the lung preceded invasion of the testicle 15 times—3 years, 12 years (2 cases), many years (2 cases).[2]

Bone or joint tuberculosis preceded 8 times—1, 2, 12, many years (2 cases).

Inguinal adenitis preceded twice.

Fistula in ano preceded twice.

Renal tuberculosis preceded 11 times, active prostatic or vesical tuberculosis, 13 times.

Many of these patients showed several localizations of tuberculosis before it attacked the testicle. For example, in one the wrist, ribs, sternum and bladder were invaded in succession, and then the testicle; in another there had been glands in the neck and ischio-rectal abscess; in another Pott's disease and tuberculosis of the prostate; in another phthisis and tubercular kidney. But most important of all is the fact that in no case have I been able to satisfy myself that the testicle was the only organ involved in the tubercular process. Careful examination has always shown one of three conditions—tubercular bacilli in the urine, indurations about the prostate and vesicles, or a distinct haze in the urine due to prostatic catarrh. In this last class of cases the prostatic secretion is always purulent.

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[2] In the others the interval was brief.

I recognize the possibility of primary tuberculosis of the testis though I have not seen it. I am sure that in certain of my cases tuberculosis of the testicle has been the only lesion of any moment in a given patient. Yet I am equally sure that in every case I have carefully examined there has been some congestion of prostate or vesicles, or both, at the time of examination: and I am inclined to believe that this congestion is always tubercular. Hence I believe that the tubercular testis is always an index of general tuberculosis of the genital organs.

A very striking confirmation of this fact is that only one of these patients was alleged to have begotten any children after involvement of one testicle. I do not know that they were all sterile. But I was surprised, in collecting these cases, to find how many of them, being married, had ceased to beget children a year or two before invasion of the first testicle.

This condition has nothing to do with sexual potency; for only 5 complained of impotence, though doubtless many others had, at least, a relative decrease in potency.

But it would be very interesting to know whether patients with tuberculosis of only one testis have azoöspermia. I have examined but one and could find no spermatozoa in his semen.

Let me, therefore, present to you, as a matter for future research, the examination of the seminal fluid of every case of unilateral, testicular tuberculosis that you see. I am sure your findings will be interesting.

But one patient is reported to have begotten children: let me cite the case briefly.

The patient came to my father in 1888 with history of spontaneous epididymitis on both sides. Examination revealed suppuration in both epididymes. The condition of the internal genitals is not noted. He was a casual youth, 21 years of age; he visited the office only twice or thrice, and then drifted away.

Twelve years later, in 1900, a gentleman called, who stated that he was the father-in-law of this young man; that the young gentleman was very wild and had separated from his wife whom he had married within a year of his visit to us; but that before the separation she had two children.—"*Honi soit qui mal y pense!*"

Exciting Cause—One cannot but feel that the onset of tuberculosis in an organ so exposed to sexual and traumatic violence as the testicle must often be occasioned by some such agent. Indeed it is currently believed that tuberculosis of the testicle often follows upon gonorrhea. Yet in only 11 of my cases was the patient known to have gonorrhea, either acute or chronic, at the time of onset; while 19 denied ever having had this disease. Six alleged that the testicle had first swollen after an injury, and, of the four cases with quiescent testicular tuberculosis who were seen through attacks of gonorrhea, two had acute testicular exacerbations, and two did not.

I have not, by the way, seen any evidence of tuberculosis inoculation by coitus.

The effect of sexual excess upon the lesion I have no means of judging; though I have seen one case of chronic, unilateral testicular tuberculosis arise *after* the death of his wife in a man who asserted that, during ten years of married life, he had practiced sexual intercourse on an average of once in every twenty-four hours.

PATHOLOGY.

The lesion in the testicle may be but an incident in a general tuberculosis. Indeed, of the twenty-four patients already mentioned, who had lesions in lung, bone, etc., before the genitals were attacked, four continued to develop lesions outside the genito-urinary tract thereafter, and were joined by seven more; making thirty-one cases in which the genito-urinary tuberculosis was but a part of a more or less disseminated and consecutive invasion of different organs.

Of the subsequent lesions, six were in the lung—shortly (twice), 4, 6, 6, and 10 years after the invasion of the testicle; four were in bones, joints, or tendon-sheaths (intervals of 1, 2, 5, and 7 years); one in the meninges (6 years); one in the groin glands (3 years); one in the colon (1 year); while one case of diabetes after 10 years was doubtless due to pancreatic tuberculosis.

But, in contrast to these thirty-one cases of truly generalized tuberculosis, there are twenty-six cases followed at least one year, in which the active tuberculosis was confined entirely to the testicle; and half of these were followed less than four years. The remaining thirteen cases of isolated testicular tuberculosis persisted respectively for 4 (3 cases), 6, 7 (2 cases), 8 (2 cases), 9, 10, 12, 14 and 25 years. In these cases there was never even any grave involvement of the internal genital organs.[8]

Side First Affected—In 58 cases the side first affected was noted, and of these 27 began in the right testicle, 31 in the left.

There is a general impression, which I have also harbored, that genito-urinary tuberculosis often clings to one side of the body. I doubt whether this is as often the case as we have supposed, for the opposite testicle is often promptly affected. I find, morever, that in the 7 cases of general genito-urinary tuberculosis in which the onset of the disease in testicle and kidney is accurately reported, 4 were primarily unilateral; that is to say the first kidney affected was on the same side as the first testicle affected; while 3 were not.

Site of the First Inflammation—I have never seen a case of primary tubercular orchitis. The primary focus in my cases has always been the epididymis. This is the rule, though apparent exceptions are occasionally reported. But I think there is a general impression that gonorrheal epididymitis usually begins in the globus minor, while tubercular epididymitis usually begins in the globus major. In only 25 cases could any information upon this point be obtained; yet in 19 of them the first nodule appeared in the tail of the epididymis, leaving only 6 in which it began in the head. It would be dangerous, therefore, to insist on the diagnostic importance of the site of the first lesion.

Of associated lesions, besides those already mentioned, it may be said that abscess of the vas is recorded 11 times; hydrocele 30 times. Yet in the cases that come to operation, we practically always find hydrocele, or else adhesions in the tunica vaginalis, showing that it has been inflamed; and so common is tuberculosis of the vas that it is scarcely ever safe to bury the end of the divided vas without providing for drainage from it.

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[8] Thirty-five remained purely genital one year or more. Two of these were followed 4 years, one 5, one 8, one 9, one 11, and one 13 years (besides those noted in the text as purely testicular). Fifteen (exclusive of the above mentioned) remained urogenital one year or more. Two of these were followed 4 years, one 5, one 7, two 8, one 10, one 16, and one 18 years.

Recognizing how irregularly tuberculosis may leap from one organ to another we can make no attempt to arrange the confused succession of lesions presented by our patients.

Theoretically we might divide them into two classes: (1) those in which the testicular lesion is the chief active tubercular lesion in the body (26 cases), and (2), those in which the tubercular lesion is only a part—perhaps a relatively unimportant part —of genito-urinary (24 cases) or general (31 cases) tuberculosis; but no patient remains hard and fast in either class. The clinical picture varies as one or another lesion rises into prominence. One may follow clinically, however, and with some degree of order the course of the lesion in the testicle itself (where it may be acute or chronic, suppurating or quiescent) and in its fellow.

Onset—The onset was acute in 34 cases, chronic in 34. It is hardly necessary to describe the difference between the two. The chronic lesion consists of a slightly sensitive nodule in the epididymis, while the acute epididymo-orchitis causes intense congestion and edema, and is associated with fever and pain. In one case the process was so virulent as to simulate strangulation of the testicle; in many others it resembled acute gonorrheal epididymitis.

This acute onset, as well as the acute exacerbations during the course of the disease are probably due to mixed infection. Caseation and fistula may, however, occur without any mixed infection.

Such breaking down, whether acute or chronic, simple or tubercular, occurred in at least 76 of the 153 testicles, probably in a great many more. It is a striking fact, however, that of these 76 cases of softening or suppuration, 53 occurred in the first year, while late suppuration was noted only once in the 3d, 4th and 5th years respectively.

It would seem, therefore, that, if the process remains chronic in the epididymis for a year or two, it is not very likely to break down. I have seen the nodule become swollen and threaten to break down in later years; but it has always either settled back into its chronic condition or been removed before softening took place.

On the other hand, no suppuration occurred in 29 cases watched for more than one year. Fourteen of these were followed less than four years, 9 from four to nine years, and 6 respectively ten, eleven (2 cases), twelve (2 cases) and sixteen years.

Condition of the Opposite Testicle—Here is perhaps the most important point of all. Many patients permit one testicle to be removed in the hope that the disease is confined to this one organ, and may be eradicated. That this hope is utterly vain, and that relapse upon the opposite side almost inevitably occurs—be the operation ever so slight or ever so radical—I hope to show in discussing the various operative procedures.

For the present let me summarize the 87 cases in which it is definitely recorded that the opposite testicle was or was not affected. Fifty-three so relapsed; 34 had not done so when last seen.

The following table shows the details:

RELAPSE ON OPPOSITE SIDE.

	YES.	NO.
Shortly	34	14
1 year	12	5
2 years	2	2
3 "	2	3
4 "	1	0
5 "	1	3
7 "	0	1
8 "	0	1
9 "	0	1
10 "	1	1
14 "	0	1
16 "	0	1
27 "	0	1
	53	34

It is notable that, in practically every case the relapse occurred within four years; hence if the opposite testicle escapes infection five years, it is pretty well out of danger. The 7 cases showing no infection of the opposite testicle at intervals varying from 7 to 27 years will doubtless remain unilateral, and they probably represent from 10% to 20% of the total number.

Subsequent Lesions Elsewhere—Mention has already been made that extension of the tuberculosis from the kidney to the genital organs occurred in 11 cases. In one of these the kidney was involved thirteen years before the testicle was attacked; in another seven years; in 2 cases three years, once two years, and twice one year. In the remaining 4 cases the kidney was known to be involved only a short while before the testicle.

The converse of the picture—extension of genital tuberculosis to the kidney—took place 9 times; once in each year from the first to the eighth, and once in the sixteenth year. Let me add that these dates are surely none too accurate; for renal tuberculosis may begin long before the patient suffers enough to seek a physician.

Extension beyond the genito-urinary tract occurred 11 times as already stated; and in 4 of these there had been previous tuberculosis elsewhere. The progress in these 4 cases was as follows:

1. Ancient hip disease; testis at 43 years; lung a few months thereafter.
2. Humerus, ancient; testis at 26 years; then opposite testicle; then glands in the neck at 27 years; lung and kidney at 31 years; and died at 32 of tubercular meningitis.
3. Ancient Pott's Disease; left testis at 47; rib at 48; right testis and right kidney at 50; teno-synovitis at 54; and rib at 62.
4. Elbow, toes, fingers and rib at 21; both testicles at 22; glands in the groin at 24.

No statistics can be derived from these cases; they simply illustrate the uncertainty and irregularity of tuberculosis.

Prognosis of Cases not Operated On[4]—One would suppose that the prognosis of suppurating cases was far worse than of those that did not suppurate. Practically speaking, however, this does not prove to be the case; for the pain and fever of suppuration and the disgusting sinus that follows rupture of the abscess lead the patient to take so much better care of himself that, on the average, such cases seem to do better than those who do not suppurate.

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[4] In some of these the first testis was operated upon; calculation is then made from the second.

I have followed for more than a year 35 cases that did not suppurate and 34 that did (one duplicate). Of the suppurating cases, 18 were still active when last seen, 12 of them within three years, 2 four, 3 five, and 1 six years. Sixteen either burst or were incised; suppurated for a certain number of months thereafter; and then were seemingly cured. Three such apparent cures were followed but one year; 1 for two years; 1 for four; 1 for five (bilateral); 1 for six; 1 for seven; 1 for eight; 2 for ten (1 bilateral); 1 for twelve; 1 for thirteen[5]; 1 for twenty-five (bilateral); 1 for twenty-seven years. Yet, to prove that, no matter how long these patients remain well they are not absolutely guaranteed against relapse, in 1 case suppuration followed gonorrhea fourteen years after apparent healing.

That 30% of cures, watched for more than three years, should follow suppuration in the tubercular testis is most surprising, and it is to be feared would not be verified if the cases were more numerous.

Yet, on the other hand, those cases which did not suppurate were forever smouldering or advancing.

Single cases showed irregular activity as late as five, six, eight and ten years after the onset; while apparent cures were observed at five, eight, nine, twelve and sixteen years—only 14%.

The Longest Cases—I fear, gentlemen, that I have given you so many statistics as to confuse the issue pretty thoroughly. I realize how difficult it is to hold all these facts in one's head; and, therefore, in order to clear the horizon a little, I shall briefly recite the history of the 10 cases observed for ten or more years after the onset of tuberculosis of the testicle.

1. At 36 years the right testicle suppurated, and the abscess burst and healed after a certain number of months. The patient remained well ten years later.

2. At 25 the right testicle was acutely inflamed during a gonorrhea. It did not suppurate; the acute inflammation subsided, but left lumps in the epididymis. Five years later there was prostatic abscess, and five years after that the left testis and vesicle were acutely inflamed. The testis did not suppurate within the year during which the case was followed.

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[5] Opposite testes of one patient.

3. At 33 years both testicles enlarged spontaneously, and suppurated. They then remained quiet for ten years, when he was again seen with pulmonary tuberculosis, diabetes, and a slight exacerbation, lasting only a few months, in the right testicle.

4. This is the case already mentioned, who had double suppurative epididymitis at 21, and was said to be well and have two children twelve years later.

5. Left gonorrheal epididymitis at the age of 21, followed by suppuration and sinus. A year later the right testicle became involved but did not suppurate, and two years after that, a prostatic focus became active. When last seen, 13 years after the onset of his trouble, the testicles were well but the tubercular cystitis and prostatitis continued active.

6. Pott's Disease in youth; at the age of 47, the left testicle enlarged spontaneously, suppurated within two months, and was cured by epididymectomy one month later. In the following year, abscess due to necrosis of a rib was scraped, and two years later the right testicle enlarged and was cured by epididymectomy. About this time, acute and severe suppuration in the right kidney occurred; but no operation was performed; and the patient, going for several months every year to California and various other health resorts, improved very greatly in general condition; until, at the age of 54, seven years after the onset of his testicular trouble, he returned with tubercular teno-synovitis of the flexor tendons of the right wrist. This was drained and injected with iodoform emulsion for several months. During all this time he had no symptoms from his genital organs. The testicles were entirely quiescent; but the right kidney was actively suppurating, and there was probably some involvement on the opposite side. Six years later, thirteen years from the beginning of his trouble, I heard that the rib had suppurated and been incised again.

7. At 18, acute, spontaneous inflammation of the left testicle, soon followed by suppuration and fistula, and ultimately healing. It remained sound for fourteen years, when it relapsed in the course of a chronic gonorrhea (there was some suspicion of prostatic tuberculosis in this case).

8. Left testicle spontaneously and chronically involved at the age of 21. It so remained, and sixteen years later, tuberculosis of the left kidney developed.

9. At the age of 20, the right testicle and, shortly after, the left spontaneously enlarged, suppurated, discharged and healed. When seen twenty-five years later, both were lumpy and dormant, and there was a nodule also in the vas on the left side.

10. Pulmonary tuberculosis in early youth. At the age of 28, the right testicle spontaneously enlarged, suppurated, and discharged. The epididymis was quiet and nodular when he was seen twenty-seven years later.

These case reports are little less than shocking in their optimism: and, were there but one or two of them, I should gladly put them down to mistaken diagnosis. For it seems incredible that so large a proportion as 10% of the cases on our books should have lived at least ten years from the involvement of the testicle; and still more incredible that, of these 10, no less than 4 were, seemingly, absolutely well of all tuberculosis—and this without any operation. Such statistics make one very hopeful about tuberculosis of the testicle, though they by no means remove the uncertainty of prognosis in any given case. Yet I can positively assert that some of my most promising cases now are those that at one time looked absolutely hopeless.

One patient, for instance, summoned me after having lost one testis by "guaranteed" amputation, and with its fellow in a sea of pus. His physician told the family he could not live three months; but the abscess was drained and he was sent to Liberty. A year later he returned healed, but with much albumin and many casts persisting in the urine. He took part in one of our most dramatic fires of recent years; went to Western Pennsylvania as a preacher; returned to New York two years later; got himself insured in the New York Life; left the ministry; studied medicine; and is now recovering from his first clap. His has been a busy life these last six years.

Mortality—I can record no mortality from tubercular testicle. One patient died of phthisis (1½ year), one of tubercular meningitis (6 years), and one of pelvic abscess after operation (6 years); but none of these deaths is directly attributable to the testicle.

DIAGNOSIS.

The three conditions with which the tubercular testicle is likely to be confused are simple epididymitis, syphilis, and neoplasm. The means for distinguishing these three conditions are the following:

1. Aspiration of hydrocele or drainage of abscess in order that the lesions of testicle and epididymis may be accurately palpated.

2. A familiarity with the clinical aspect of tuberculosis of the testicle—the little, rounded nodules; the diffuse infiltration of the epididymis; the acute epididymo-orchitis; the frequency of hydrocele and abscess; the ever-present sensitiveness to pressure.

3. Tubercular family history, upon which too much weight must not be placed, and tubercular personal history, which is often an important aid in diagnosis.

4. Evidences of tuberculosis in the internal genital organs, as evinced by active tubercular lesions, chronic tubercular nodules, or a slight haze in the urine and some pus in the prostate (which may be expressed by massage).

5. The diagnosis can be absolutely clinched by discovery of the tubercle bacillus in the urine, in the pus massaged from the prostate, or in the contents of the hydrocele fluid or the abscess.

6. Still further confirmation may be obtained by operation.

Yet that these signs may all fail I am sure from several cases which I have come upon, in which the observation of months failed to distinguish absolutely between tuberculosis and other lesions.

Only 3 cases will be cited, in one of which simple inflammation simulated tuberculosis; in another of which I advised the removal of a syphilitic testicle; and, in the last of which a neoplasm of the testicle itself was very misleading.

CASE 1. The patient is 39 years of age. He complains that, three months ago, having a little uneasiness in the perineum, he consulted a physician, who passed a sound and a searcher.

After this there was for the first time a slight urethral discharge; for the cure of which the physician injected nitrate of silver into the deep urethra. After six days of this treatment the patient took to his bed with acute cystitis and left epididymitis. He was in bed for three weeks, and then the testicle suppurated. When first seen there was an abscess at the tail of the epididymis, which he opened. The urine was acid, purulent, and dense, and contained spermatozoa and albumin. Urination urgent, once at night and six times by day, and accompanied by terminal spasm. The patient had lost eighteen pounds.

He was at first put upon internal medication, and then treated by instillations of thallin and sulphate of copper. He was much improved in a month, and left town, to return again in two years with a little pus in the urine but the testicle entirely well.

Two years later—in 1895—the urine is absolutely normal and sparkling, and palpation of the internal and external genitals reveals absolutely nothing.

This is one type of pseudo-tubercular, simple epididymitis. In another type, the epididymis remains lumpy for a long time after the first involvement and, occasionally, flares up. Rest, tonics, stopping urethral treatment, elevation of the testicle, and application of ichthyol plaster to it relieve this condition and establish the diagnosis.

CASE 2. Feb. 18, 1905. Patient is 34 years of age. Gives no previous venereal history, except a doubtful story of a sore on the frenum in June, 1903, which lasted but a week. He immediately began mercurial treatment and has continued it ever since. There has been some vague eruption on the genitals, some fleeting mouth lesions.

A letter to the physician who treated him evokes a non-committal reply.

His present complaint is a nodule about one centimeter in diameter, with little irregularities in its surface; but generally rounded, embedded in the top of the right epididymis and encroaching a little upon the testicle. The lump is insensitive and was discovered by accident. Vesicles both moderately distended; right half of prostate thicker than the left, but not lumpy; urine entirely normal.

He states that the lump appeared a year ago and was quite painful for a little while, since which it has been entirely painless and has rather diminished in size.

He is engaged to be married.

He was instructed to stop his mercury and not to marry; to apply 10% guaiacol to the testicle; and to take 10 minims of creosotal in emulsion three or four times a day. After six weeks of this treatment the lump distinctly diminished, and he was not seen again until September 20, 1905; when he returned married and with round lumps of all sizes throughout the testis and epididymis, with adhesions within the epididymis which could be felt to creak, but with no change either in his general health or in the normal condition of the urine, prostate, the vesicles, or the other testicle.

The diagnosis of tuberculosis was, accordingly, made: the testicle was removed in Washington, and proved to be syphilitic.

I was misled in this case by the typical, rounded lumps, by the onset in the epididymis, and by the early tenderness. But its absolute insensitiveness under my fingers, and the absence of any sign of tuberculosis of the internal genitals, should have warned me that it was not tuberculosis.

Having frankly confessed this sin, permit me to add a statement of the third case, in which the patient, a physician 30-odd years of age, stated that, for many years, he had had a slight enlargement of the left testicle. There was a little hydrocele and the entire testis and epididymis seemed full of elastic nodules; no lesions were discovered elsewhere in the body.

He was put on a trial course of mixed treatment, but frankly advised that the condition looked like neoplasm.

The treatment did no good. He consulted a number of physicians, all of whom made a diagnosis of tuberculosis; but as the lesion was beginning to be active, he submitted to operation, and the organ—which I show you herewith—was removed by Dr. George D. Stewart at St. Vincent's Hospital.

Pathological examination revealed carcinoma.

HYGIENIC TREATMENT.

The hygienic treatment of tuberculosis is as efficient in tubercular testis as in phthisis. It is the foundation of every cure. Only two remarks will be made concerning it.

1. It must be aided by intelligent surgical treatment.
2. Many patients do surprisingly well in and about New York without change of climate.

I am doubly surprised at the good results of my cases when I consider how unfaithful they have been to many of the fundamental rules of hygiene. The most remarkable patient I ever saw was a dentist 21 years of age, with very acute tuberculosis of the left testis. His hydrocele was cured by carbolic injection at the onset of the disease and, thereafter, he took heavy doses of creosotal for 18 months; but has, in the 9 years since that time, hardly left his work a day. He is pale as a hospital interne, he works 10 hours a day; he overdoes himself sexually; he went through an attack of gonorrhea last summer; yet his testis got well in three years and has so remained.

SURGICAL TREATMENT.

Let us first discuss the treatment of hydrocele and of abscess, for on these we can all agree.

Hydrocele—Small hydroceles need not be disturbed. They usually disappear with the subsidence of the acute process. Large ones may be tapped by way of palliation or may form an excuse for radical operation.

I was surprised, in the case just cited, to see a hydrocele containing twelve ounces and overlying an active tubercular testis almost as big as my fist, refill after two tappings, and yet disappear promptly and permanently after injection of pure carbolic acid. I was still more surprised to see the testicle shrink from that time on, though up to then it had been growing quite rapidly.

I find that my father and Dr. Chetwood have each had a similar success with carbolic injection, though without any obvious effect upon the testis.

I should, therefore, suggest injection of carbolic acid into the tunica vaginalis as a possible cure for certain cases of tubercular hydrocele. It will not harm the testis; in certain hyperacute cases it may benefit it.

Abscess and Fistula—Abscesses must be incised and drained; fistulae kept freely open. They may be irrigated with peroxid of hydrogen and injected with iodoform emulsion. But, if the patient must choose between local treatment in the city and hygiene in the country, let him, without hesitation, desert the surgeon and lean upon Nature.

Unless the testis is riddled with abscesses, I consider it wise not to remove it while acute suppuration is going on. Incise, drain, wait for the acute inflammation to subside, and, in a surprisingly large proportion of cases, the whole tubercular mass will be shed spontaneously, and you will find that Nature has cured the lesion and cheated you of an operation.

On the other hand, if things progress ill, you may, at any time, attempt a radical operation.

Choice of Radical Operation—These remarks are practical, and, inasmuch as I have never employed ligation of the spermatic cord or extirpation of the seminal vesicles or certain other procedures advised for the cure of tuberculosis of the testicle, I shall not waste your time by discussing them.

The three methods I have employed, or seen employed, are erasion of the active focus, epididymectomy, and castration. Each procedure has its eminent advocates, and, actually, I have seen so few of any of these operations, that it might be more prudent to withhold my views. But my feelings upon the subject are so intense that they will not be repressed.

The results of operations are the following: *Erasion*—One bilateral, not followed; one single, unrelieved; and one single relapsed in 6 months. Such results are unmitigatedly bad. *Orchidectomy*—The testis and more or less of the vas was removed from 13 patients: from two of them the opposite testicle was subsequently removed. Inasmuch as orchidectomy is usually done on the plea that the disease is localized in the testis and may be extirpated with it, 10 of these operations[6] were done upon patients who, at the time, had but one swollen testicle; while the other 5 were called for by the total destruction of the testis by suppuration or caseation.

Of the 10 patients in whom but one testicle was involved at the time of operation, 3 relapsed on the opposite side within one year; 2 after one year; and 2 more after two years, making 7 relapses in all: while, of the remaining 3 in whom the opposite side was not known to be involved, 2 were followed less than a year, and 1 was followed two years.

Further evidence of the futility of attempting amputation of the tuberculosis is the involvement of other organs within two years of unilateral orchidectomy—1 case of urethral abscess, 1 of vesicular abscess, 2 of tubercular kidney, 1 of acute prostatitis, and 1 of tubercular inguinal adenitis.

Such results simply confirm the belief that, whether apparently localized in the testicle or elsewhere in the body, tuberculosis is always a disseminated infection which cannot be amputated.

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[6] None of them performed in our office.

Contemplate for a moment, if a clinical experience has not already made you do so, the plight of a patient who has gayly sacrified one testicle upon the assurance of thereby saving its fellow. The relapse upon the opposite side plunges him into intense and black despair. This reason alone impels me to prefer some more conservative operation.

Epididymectomy—I have records of 13 epididymectomies upon 8 patients. One single operation was followed by suppuration, prompt relapse in the opposite epididymis, and removal of the testis first involved. The opposite epididymis has remained chronic and quiescent three years.

Of the double epididymectomies, two were consecutive after relapses respectively in three months and in three years.

One double partial epididymectomy—complete excision of quiescent nodules in the tail of both epididymes.

Two epididymectomies on one side and orchidectomy on the other, the testicle being removed because it seemed impossible to save it.

Two double, simultaneous epididymectomies.

Of these 7 patients, one died from pelvic abscess, arising from the end of the vas deferens that had been torn off high up inside the pelvis. The others all recovered from the operation and, though one of them has still a slight fistula, three years after operation on one side (the fellow is healed), the other 5 are entirely well as to their testicles, and have been followed for 1 year (three cases), 3 years, and 10 to 13 years.

Such results are sufficiently good to justify continued adherence to this operation.

Yet some little skill is required in doing it. The death from pelvic suppuration has warned me of the danger of tearing the vas out of the pelvis: it should be cut off at the upper end of the incision and left protruding from the skin, in order that any suppuration from it may be freely discharged.

The easiest route to the epididymis is through the tunica vaginalis. In shelling it out, one should stick close to it, in order to spare the blood supply of the testicle; and, in order to save the testicle, I believe it perfectly justifiable to cut through and leave behind manifestly tubercular tissue.

One of the arguments of those who condemn epididymectomy is that it always leaves some tuberculosis in the testis. I do not doubt the truth of this statement. Indeed, I have deliberately left a testicle full of tubercles, in two of these cases, and seen it subside and give no further trouble. Indeed some of the results have been peculiarly brilliant. Two of them scarcely show the least departure from a normal appearance, the scar of the epididymectomy having quite accurately reproduced the form of the epididymis itself.

My choice of operation is, therefore, always epididymectomy, unless the testicle is too far gone to be saved; and I am willing, for the moral effect upon the patient, to risk leaving an infiltrated testicle, believing that it can fight down the inflammation after the removal of its inflamed epididymis.

Time for Operation—I began to treat these cases ten years ago under extremely conservative influences. My father's rule has been never to touch the epididymis until it threatens suppuration; then to excise it; or to drain first and excise later. Yet, in view of the grave frequency of relapse in the opposite epididymis, the apparent frequency of sterility at the time the first epididymis is involved, and the excellent effect upon the general health and upon tuberculosis of the prostate and vesicles, which I have several times seen result from the removal of an apparently quiescent, chronic, tubercular epididymis, I am inclined at present to advise the following procedure:

If a patient appears with acute tubercular epididymo-orchitis, treat him expectantly until the lesion suppurates or becomes subacute.

If it suppurates, drain, or, in exceptional instances, remove the whole testis. When it settles down into chronic epididymitis, or if it begins as such, examine the spermatic fluid; and, if this, on several successive examinations, shows no spermatozoa, excise both the tubercular epididymis and its unaffected fellow. For this will do no harm and will prevent relapse upon the opposite side. Moreover, it will have a doubly soothing effect upon the prostatic or vesicular tuberculosis; for removal of the epididymis produces, in a less degree, the beneficial effect upon tuberculosis of the internal genitals that nephrectomy has upon tuberculosis of the ureter. If spermatozoa are found in the semen, the normal testis of course may not be touched.

This early prophylactic operation should reduce the importance of testicular tuberculosis to almost *nil,* and should prevent many of those tubercular outbreaks in other organs which seem to be fed from active or latent foci of the disease in the epididymis.

I wonder if I shall ever be able to persuade a patient to permit me to perform it.

CONCLUSIONS.

1. Testicular tuberculosis is clinically never an isolated lesion. It is only one feature of a general genital tuberculosis, for—
2. Sterility is probably frequent at the time the first testis is invaded.
3. There is evidence at this time of inflammation of the internal genitals.
4. Relapse in the opposite testicle occurs within a few years, in eight or nine out of ten cases, and
5. Such relapse is in no wise postponed by early removal of the diseased testis.
6. Moreover, though suppuration seems often to result in permanent cure of the local process, and
7. Though a chronic focus several years old is likely never to suppurate, yet
8. In no case can one feel certain of a real cure unless the tubercular epididymis has been removed. Now
9. The demoralizing effect of epididymectomy is not to be compared with that of castration, and
10. Slight tuberculosis of the testis may be depended upon to heal spontaneously after removal of the epididymis.
11. Hence epididymectomy is the radical operation of choice, unless there is hyperacute generalized epididymo-orchitis, or unless the testis is destroyed by suppuration.
12. This operation has a beneficial effect upon the general health and upon tuberculosis of the internal genitals.
13. It should, therefore, be performed early in the disease. This in spite of the fact that
14. Tuberculosis of the testis is often but an insignificant part of a generalized progressive tuberculosis, or
15. Is for many years the only active lesion of the disease.
16. If the patient is sterile, it would probably be wise to remove both epididymes, even though only one side is diseased.

TUBERCULOSIS OF THE URETHRA, SEMINAL VESICLES, PROSTATE AND BLADDER.[1]

By ALFRED MITCHELL, M. D., Portland, Maine.

IN offering this paper to the Society at the invitation of your Secretary, it is much to my regret that it contains no features of originality. While occasional cases of tuberculosis of the bladder, prostate and urethra present themselves in my hospital and private work, my observations have not been sufficiently extensive, nor my efforts at treatment successful enough, to entitle me to present an original paper upon this subject. The history of my cases of tuberculosis of the bladder, with which disease the prostate and vesicles have always been involved, would make extremely doleful reading. It would be a description in a majority of instances of prolonged and intense agony followed by death. It has been my experience that in a large majority of patients who have consulted me for this terrible affliction, the disease has become firmly implanted, and, although I have been able to accomplish something toward the relief of their suffering, my success as a whole in their treatment has been far from encouraging, in fact, I have almost dreaded to encounter patients afflicted with this disease, for in no class of cases have I so fully realized my inability to furnish assistance to suffering humanity. Therefore, I am very glad to know that others, who have opportunities of doing extensive work in genito-urinary tuberculosis have been more successful than myself in the treatment of their patients.

In discussing the subjects of tuberculosis of the urethra, bladder, prostate and vesicles, I have employed for reference the more recent editions of our American text-books, Casper's Work on Genito-Urinary Diseases, Fenwick's Clinical Cystoscopy, and have also appropriated freely from a paper by Frank, of Berlin, entitled "The Present Status of Tuberculosis of the Genito-Urinary Organs." In considering the therapeutics, I have quoted from a paper by Wright of St. Mary's Hospital, London, entitled " General Principles of Therapeutic Inoculation of Bacterial Vaccines as Applied to the Treatment of Tubercular Infection."

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[1] Read at the N. E. Urological Society, Boston, January 29, 1907.

In considering briefly the causes of tubercular disease of these regions, the prime factor is, of course, the tubercle bacillus. As it is a generally accepted belief that this micro-organism is harbored by a large majority of mankind, it is safe to assume that a certain predisposition must exist which is either the result of inheritance or due to trauma, or more frequently the resisting power of the tissues has become impaired by the ravages of gonorrhea and its sequelae. Many genito-urinary surgeons have called attention to the close relationship existing between gonorrhea and genito-urinary tuberculosis and its importance as a predisposing cause of this disease.

Another factor to be considered is that tuberculosis in these regions appears to be more active during the period of greatest sexual activity.

According to the majority of our American writers tuberculosis of the anterior urethra is an exceptionally rare disease. Many state that they have never seen a case; others claim that very infrequently it may be found in this locality. Casper says that tuberculosis of the urethra is always secondary and in his observations exclusively confined to the posterior urethra, existing only in association with tuberculosis of the prostate and vesicles. Other European surgeons differ with him, and many report cases of tuberculosis of the anterior urethra. It is possible that it quite frequently escapes observation as its symptoms are often not well defined. Frank, after careful investigation, claims that it is very doubtful if primary tuberculosis of this region occurs.

While most interesting experiments have been made upon rabbits, with a view of determining the point of the possibility of transmitting the disease through cohabitation, in a human being it has never been positively proven that an infection through coitus has occurred. In tuberculous ulceration of the external genital organs the infection passes to the inguinal glands, never to the internal genito-urinary organs.

The most frequent seat of these lesions is in the bulbar and navicular regions, the areas of normal dilation. The source of infection, the urine, being delayed in these localities, exceptionally tubercular deposits may extend the entire length of the urethra.

The ulcerations may heal, the resulting scar tissue forming strictures. Fistula may result from destructive changes.

In regard to its symptomatology, White and Martin call attention to the importance of searching for tubercle bacilli in cases of apparent causeless discharge. More advanced symptoms may be pain on urinating, hemorrhage or stricture, without previous gonorrhea or trauma. Diagnosis is made by the urethroscope and by detection of tubercle bacilli.

Tuberculosis of the posterior urethra is comparatively frequent and almost always accompanies long-standing cases of tuberculosis of the prostate, vesicles and bladder. The prostatic portion is particularly liable to infection, receiving as it does the semen from the vesicles, the epididymis and testicles, also the secretion from the prostatic ducts and the urine from the kidneys. The lesions vary from granulations to severe ulcerations, causing destructive changes which may finally result in the formation of a cavity in this region. The symptoms are similar to those of severe posterior urethritis, and as usually the vesicles, prostate and bladder are affected, the diagnosis is not difficult.

Tuberculosis of the prostate is a disease of adult life and very rarely occurs in childhood and old men. The prostate is particularly liable to absorb products of disease. Weigert terms it a reservoir of infection, because of its frequent involvement in septic processes. Casper calls especial attention to the important part which gonorrhea plays. The tendency of specific urethritis to invade this gland is well known. Add to a predisposition to tuberculosis the weakness of resistance of tissues previously invaded by the gonococcus, we have a very fertile soil for the tubercle bacilli, especially as we consider its glandular structure which offers further advantages for its growth. It is also penetrated, as previously mentioned, by the urethra and ejaculatory ducts, bringing sources of infection from the bladder, testes and vesicles. In cases of genito-urinary tuberculosis it seldom escapes.

Burckhardt has found that the prostate is diseased in seventy-three per cent. of all cases. Other authorities give even higher figures. While it may be primarily infected, secondary involvement is by far the most frequent form. There are nearly always other lesions of the body, commonly in the lungs and kidneys, the infection being carried to the prostate by the blood current or directly by the urine from the kidneys. Very frequently it occurs by extension from the epididymis.

Very briefly describing the pathology, tubercles develop which either undergo degeneration and lead to abscess formation or become encapsulated, which leads to connective tissue induration. In early cases one lobe is usually affected, in advanced both lobes become involved. If the tubercles are isolated from the urethra, the process may heal under medical treatment. Abscesses have a tendency to perforate externally and empty themselves. Whether encapsulation or abscess formation results depends upon the virulence of the bacilli, addition of secondary infection and the power of resistance of the tissues of the individual.

The symptoms, when the disease is confined to the interior of the gland, are not prominent. When the process extends they become apparent, frequent and painful urination, hematuria and hemaspermia. None of these symptoms are characteristic, the diagnosis being made by history, rectal examination noting the indurated nodules or areas of softening, and the examination of expressed material may show tubercle bacilli. The prognosis is rather doubtfully given as not entirely unfavorable unless associated with tubercles which threaten life. If; in addition to prostatic disease, a unilateral renal tuberculosis is present, cure is possible, the patient having good power of resistance. Cases in which the bladder, epididymis and vesicles are involved offer a very poor prospect of cure. The occurrence most to be dreaded is vesical tuberculosis.

TUBERCULOSIS OF SEMINAL VESICLES.

In regard to this disease it seems to be the consensus of opinion that it is almost always secondary to involvement of the prostate, prostatic urethra and epididymis. Casper says it is much more common than formerly thought and is usually combined with tuberculosis of the testicles, epididymis, vas deferens, prostate, bladder and kidneys, or simultaneously with tuberculosis of other organs, especially the lungs. He states that primary tuberculosis of the vesicles is very rarely diagnosticated, but that many cases of tuberculosis of the prostate and epididymis may have been preceded by a tuberculosis of the vesicles, the existence of which was unknown owing to the difficulty with which diagnosis can be made.

Frank claims that the disease is usually bilateral, that its existence with genito-urinary tuberculosis makes it appear to be a secondary affair, but that it may occur primarily. Saxtorph found it seven times in two hundred and five cases of seminal tuberculosis, so that the vesicles may become diseased through the blood current as well as by extension.

In children, tuberculosis of the epididymis and testicles is not a very frequent occurrence. In fifty-one cases of tuberculosis of the testes in children, in but two instances were there any suspicions of involvement of the vesicles. This fact seems to demonstrate that the infection has a tendency to follow the semen, which in the period of greatest sexual activity is almost constant.

Kramer's deductions from a series of carefully conducted experiments on rabbits are as follows:

Tubercular infections of the seminal vesicles, prostate and urinary bladder originate almost always secondarily from the kidneys and testes, possibly without involvement of these organs, or they are independently affected, of congenital or hematogenous origin. The tuberculous process cannot spread from here either by way of the vasa deferentia to the testes or by way of the ureters to the kidney. The familiar changes accompanying tubercular degeneration take place. The wall becoming infiltrated and thickened and the tubercles undergoing caseous changes, often the tissues lying between the two vesicles become infiltrated, forming a mass continuous with the prostate and covering the bladder wall at its base.

Frank states that a number of observers have noted that tuberculosis of the seminal vesicles frequently leads to connective tissue encapsulation and atrophy, and describes cases in which vesicles have undergone complete connective tissue degeneration and have been transformed into atrophic, obliterated and flattened ducts.

In thirty-six cases, Hall and Moritz saw this result in nineteen. Casper, in his observations, has not noted this result, but reason that it may be so. In cases of abscess formation large cavities occur which may break into the rectum or point toward the perineum. In the formation of these cavities, the accompanying tuberculosis of the prostate plays a large part. The destruction may proceed to such an extent that the prostatic urethra may be destroyed, a large cavity being formed into which the bladder opens, which is outlined by the capsule of the destroyed prostate. This becomes filled with purulent urine, secondary infection takes place and still further destruction results; abscesses may burrow, breaking into the rectum, perineum or illiac and inguinal regions. Severe functional disturbance results and catheterization of the bladder may be rendered practically impossible by these changes.

In its early stages symptoms are not at all prominent. A sensation of heaviness in the perineum may be present, bloody semen is sometimes ejaculated, at first sexual desire is increased, but as the disease progresses impotence may take place, although often patients afflicted with genito-urinary tuberculosis retain the power of cohabitation even after the disease is well advanced. Accordingly the detection of the disease is difficult in the early stages, but when the neighboring organs are involved and urination becomes frequent and painful, and especially when nodulation of the epididymis is present, it becomes easier. Rectal palpation in its early stages may detect small hard nodules, and as the disease progresses the vesicles may feel like distended, irregular pouches in some instances, in others they may be hard and very nodular. Pain may be present upon pressure with the finger in some cases, in others it is absent. If any secretion is expressed, it may be examined for the tubercle bacillus. Casper states that if a yellowish-white discharge takes place from the urethra in a man in whom gonorrhea can be excluded and no other cause determined, it is extremely likely that it is due to tuberculosis of the vesicles.

TUBERCULOSIS OF THE BLADDER.

The disease is ordinarily secondary, the infection either being brought directly from the kidneys to the bladder or occurs by extension directly from the seminal vesicles, testicles, epididymis or prostate. Vesicle infection may take place from a primary focus in the lung, by way of the blood current or lymph stream. Casper is extremely skeptical as to the instances of primary tuberculosis of the bladder and states if we admit that it exists, it is necessary to exclude the presence of any other tubercular focus in the body, which is extremely difficult to do. He calls attention to the fact that a tubercular process may remain latent in certain organs for years without producing marked symptoms.

Cornet is of the opinion that infection may take place from without through coitus, and that tubercle bacilli may pass through the urethra which is not susceptible to these organisms, and take up their abode in the bladder.

Fenwick goes into the subject of primary and secondary infection very extensively. He admits that his statements and opinions are at variance with those commonly accepted. He states that the bladder may be affected through three distinct avenues:

(a) Primarily, no other deposit found existing.

(b) By extension from a tubercular process in the male genital apparatus, kidney, or ureter.

(c) Secondarily, by way of the blood stream, from some pre-existing focus placed outside or genito-urinary tract.

He says: "I submit and attempt to show that each of these classes can be recognized cystoscopically when they are in their earlier stages, that each has proper treatment of its own and that if the disease is to be combatted with any reasonable hope of cure, each case must be detected early, classified rightly and treated not by any fixed method applicable to all, but on lines which seem adapted to that particular case." Fenwick's experience with the cystoscope in these cases has probably been more extensive than any other observer and his opinions are certainly entitled to the respect of the profession. He states the usual location of the primary vesicle deposit to be on the posterior or superior wall, which differs from the observations of many. Bryson, Senn and Güterbach claim it to be at the trigone, and Morris the deep urethra.

The primary lesion may be present in what he classifies as the diffuse form or as a solitary ulcer. He gives as its characteristic symptoms irritability of the bladder and pain at or towards the glans penis. He says hemorrhage may not be among the initial symptoms. One of the striking features is its intermittency, the patient at periods feeling perfectly well, but if cystoscoped the disease is found to be progressing insidiously.

In second class (b), tuberculosis invading the bladder from a tuberculous source in the male genital apparatus, in cases of infection from the epididymis, the lesion is usually found at the inner side of the orifice of the ureter at the side of the epididymis infected.

He gives the clinical symptoms as follows:

The patient has a history of long latency of tubercle of the epididymis. A varying number of years afterwards he may notice a sudden and painless hematuria. The initial attack will subside only to be succeeded by others. The hemorrhage is often profuse, and with it he may notice a constant burning in the penile urethra and marked irritability of the bladder, or he may feel severe pain in the kidney on the same side as the old testicular affection. The age of the patient is usually between thirty and forty.

In tubercular infection from a primary deposit in the prostate we find similar symptoms, and cystoscopy shows a dark red swelling on the trigone over the affected lobe. In vesicle invasion from primary renal tubercle he describes characteristic appearances of the ureteral orifices, they being enlarged, open and displaced, and the mucous membrane surrounding them diseased. The treatment he advocates for the different invasions I will describe briefly when I discuss that subject. He substantiates his claims by a series of illustrative cases which appear to give him just claims for his opinions both in the matter of diagnosis and treatment.

To describe extensively pathological changes is beyond the scope of this paper. Briefly stated, if unchecked the tubercular deposits degenerate into areas of softening from which ulcerations result. These gradually increase in size, finally secondary inflammation of the mucous membrane and the muscular areas occurs. In advanced cases, the walls of the bladder become greatly thickened and its capacity much diminished. The symptomatology of this disease in its earlier stages has already been discussed, frequency of micturition, hematuria and penile pain being the prominent features. As the disease progresses and secondary inflammation takes place, the symptoms become greatly intensified and the condition of the patient is usually deplorable. The calls to urinate are frequent and urgent and cannot be denied, and intense pain accompanies every act of micturition. The bladder never rests; as soon as it contains a small quantity of urine the patient must void; this is followed by pain along the urethra and in the glans penis, which in turn is succeeded by contraction of the bladder, giving rise to severe tenesmus, the resulting pain being intense.

Fortunately in all cases the degree of suffering is not so severe. A number of months ago I had an advanced case of tuberculosis of the epididymis, prostate, vesicles and bladder in my service at the Maine General Hospital. The patient was obliged to void every fifteen minutes, at times oftener, his urine was creamy with pus and every examination showed large numbers of tubercle bacilli. Singularly enough, he experienced but little pain during the act of micturition. He failed steadily and died after he had been in the hospital about one month. I mention this as being the only instance in my experience in which the sufferings of a patient afflicted with tuberculosis of the bladder were not agonizing.

The diagnosis of tuberculosis of the bladder in advanced cases should not be difficult. The history of frequent and painful micturition, hematuria, pyuria, tubercular predisposition; possibly a nodular epididymis, together with rectal palpation, would at once arouse suspicion and lead to examination of the urine for tubercle bacilli, which, when the disease has progressed extensively, are usually easily discovered.

In early cases, the problem is more difficult. Any obscure affection of the bladder to which no definite cause can be assigned should at once lead the surgeon to suspect tuberculosis and to conduct a careful investigation to confirm his suspicion. The urine should be examined repeatedly for tubercle bacilli, and as often the examinations are negative, some of the centrifuged sediment should be injected into the peritoneal cavity of guinea pigs, which is considered a fairly accurate test, enlarged glands resulting in the animal after a period of a month or more. But even this result is often negative as it is possible that a bladder wall may be tuberculous and yet no bacilli be passed in the urine.

Casper calls attention to the fact that tuberculous urine in which no tubercle bacilli are present may be recognized by the fact that often, not always, no other organisms whatsoever are contained in it. Hence, the same rule which obtains in the case of pleural effusion is to be followed, that if no tubercle bacilli nor other organisms are present, it is generally tubercular.

Cystoscopic examination may show the characteristic lesions which Fenwick so carefully describes in his work on clinical cystoscopy. Many authorities do not favor the use of the cystoscope or any instrumentation in cases where tuberculosis is suspected or known to exist, owing to the danger of secondary infection which adds so much to the severity of the disease. Such examinations as have been described, together with an accurate history and a careful investigation for other tubercular foci in the lungs, epididymis, prostate and vesicles, etc., will usually make clear the nature of the affection. The outlook for patients afflicted with genito-urinary tuberculosis is always grave, for we are dealing with a class of patients who are often predisposed by inheritance and who perhaps are already suffering from tuberculosis of other organs.

It is still more gloomy in tuberculosis of the vesicles, prostate and bladder, for in most instances the disease is secondary and surgical procedures are not often of avail. While recovery sometimes occurs under proper conditions and proper treatment and while the future offers hope of still further advances in the conduct of these cases, at the present time the chances for recovery are very unfavorable.

In considering briefly the methods employed at the present time for the relief of these cases, a few words might be said in regard to preventive treatment. In patients with a predisposition to tubercular disease who suffer from gonorrhea and its sequelae, care should be taken to bring about as complete a cure as possible.

Under preventive treatment might be mentioned the importance of recognizing early tubercular lesions of the epididymis and testicles. The prompt removal of a tubercular testicle before the disease has extended to the prostate and vesicles may be the means of saving a patient from a life of suffering. In general, if the disease is primarily in the genito-urinary system, constitutional measures may be employed, an outdoor life and favorable climate being indicated, every effort being made to better the patient's condition. If no improvement results and the tubercular processes continue to extend, recourse should be made to surgery in an attempt to eradicate the disease.

In advanced cases surgery offers no hope of cure, but may do much to relieve the sufferings of the patient.

In tuberculosis of the anterior urethra, instillations of bichloride of mercury, 1-6000, are recommended. If the lesions are limited to this region, an attempt may be made to remove the deposits by curettage or incision. In some cases amputation of the penis has been advised.

The posterior urethra being usually involved in tuberculosis of the bladder, the same methods of treatment are applicable. In tuberculosis of the prostate and seminal vesicles, surgery does not appear to have been very successful, but in dealing with tubercular deposits in these regions, it is advisable to undertake their removal, the best method of approach being by way of the perineum by employing one of the various incisions advocated. Young reported some years ago two cases in which he successfully removed the vesicles by the suprapubic route, but as so frequently happens the patient died later of tuberculosis of the lungs. Abscesses should be incised and drained through the perineum. Permanent fistula often results from this procedure. In tuberculosis of the bladder the drugs commonly employed in other forms of cystitis, namely, hexemethylene tetramine, salol and the balsams, appear to be of no benefit in advanced cases. Some authorities recommend creosole, guiacol and ichthyol. For the relief of pain, morphine and the other derivatives of opium are indispensable. Belladonna is at times of service to diminish irritability. The instillation of bichloride of mercury as advocated by Guyon appears to have accomplished favorable results in many cases, employing a solution from 1 to 10,000 to 1 to 1,000. The reaction is extremely severe and morphine must be administered after it is used. It should not be employed oftener than twice weekly. If no benefit results after three or four applications, it should be discontinued. Casper states that he has tried it in numerous cases, in many of which benefit was derived, in a few a cure, in some no improvement resulted. Iodoform emulsion, although recommended in many text-books, does not appear to have been of any value, and nitrate of silver, of so much service in other forms of bladder infection, is noted by many as being decidedly harmful.

Fenwick advocates for treatment of primary vesicle tuberculosis medically, sandal oil, and hexemethylene tetramine. If the deposit be diffuse, no cutting operations should be attempted, but injection of Koch's new tuberculin should be tried. If solitary ulcer is present, the tuberculin should be employed; if it shows no improvement under this treatment, he advises suprapubic cystotomy and the passage of a caisson on to the ulcer. Through this the ulcer is curetted and iodoform applied.

When infection takes place from primary deposit in the epididymis or prostate, he says treatment at present is disappointing, but advises tuberculin and, if the ulcerations do not heal, curettement. In tuberculosis of the bladder, when secondary to the disease of the kidney, he advocates, as do all other genito-urinary surgeons, removal of the kidney, this procedure often producing brilliant results.

Israel, who has examined cystoscopically a number of bladders after this operation in which deposits have been previously located, has reported a number of cases in which the lesions have entirely healed. The recognized fact of the inefficiency of Koch's tuberculin in this class of cases is well known, many reporting that the patients were rendered worse after its administration, others claiming that in some instances improvement resulted. The recent work of Wright of St. Mary's Hospital, London, upon the determination of the opsonic index of the patient and regulating the amount of lymph employed for the inoculation according to the separate findings, seems to have placed this method of treatment on a rational and scientific basis. According to his investigations the lack of success attending previous inoculations was due to the fact that the amount ot tuberculin employed was much too large.

While it is too early to pass final judgment, his work upon the subject of general therapeutic inoculation of bacterial vaccine as applied to tuberculous infection is most convincing. As there may be members present who have not read this remarkable paper, I will take the liberty of reading an extract from it relating to experience with tuberculosis of the bladder.

"TUBERCULAR DISEASES OF THE GENITO-URINARY SYTSEM."

"From some points of view more convincing, in others only less convincing, than the results obtained in connection with lesions which are directly accessible to sight and touch, are the results obtained in connection with tubercular diseases of the genito-urinary system, in particular in the cases where these involve the bladder. We have in the fact that these cases are associated with distressing pain and frequency of micturition, and in the fact that the presence or absence of tubercle bacilli in the urine can here be determined by microscopic observation, the means of measuring success and failure.

"Case 1. The patient, a man, aged twenty, when first seen twelve months ago, was suffering from extreme frequency and looked worn with pain. He was only with difficulty able to draw himself upright, and could only with some distress climb upstairs. There were considerable swelling and tenderness in the prostate and back of the bladder, and the urine contained some blood and a large quantity of pus. Microscopical examination revealed tubercle bacilli in considerable numbers in the urine. Cultures showed that there was no other bacterial invasion. The patient had been previously treated with inoculations of new tuberculin, the doses having been increased by geometrical progression up to 1/25 milligramme. After the inoculation of larger doses, the pain and frequency of micturition were greatly aggravated. After waiting till the immediate effects of the last inoculation had passed off, inoculation was recommenced with 1/100 milligramme of new tuberculin. The tuberculo-opsonic index of the blood now stood at 0.62. After repeating the inoculation with 1/100 milligramme at intervals of ten days, and then tentatively advancing to a dose of 1/50 milligramme without achieving any sensible improvement in the opsonic index or clinical symptoms, the dose was reduced to 1/800 milligramme. The inoculation of these doses at ten-day intervals was followed by steady and sustained improvement both in the opsonic power and clinical symptoms. There was also a marked diminution in the prostatic tumefaction.

After the dose had been for a time increased to 1/600 milligramme it was again reduced to 1/700 milligramme. While the frequency of micturition and the prostatic swelling have been much abated and while the patient is practically free from pain, his urine still contains tubercle bacilli. His condition is, however, now such that he is able to hold his urine for two hours at a time and capable of undertaking without fatigue a long day's shooting."

His summary of the results obtained by therapeutic inoculation in cases of localized tuberculosis:

" In view of the very favorable and, what is almost more important, uniformly successful results which can, as will have appeared, be obtained even in the most intractable cases of localized tubercular infection by the therapeutic inoculation of tuberculin carried out under the safeguards explained above, and in view of the fact that not less favorable results can be obtained by the aid of the corresponding bacterial vaccines in the treatment of localized infections by other micro-organisms, I do not hesitate to contend that we have, in the power of raising the antibacterial power of the blood with respect to any invading microbe, out of all comparison the most available asset in medicine. I would, in view of this new asset in medicine, fain induce the surgeon to abate something from his conviction that extirpation and the application of antiseptics form any connection with bacterial infection the only possible means of cure; I would have the surgeon resort to extirpation only when the physician tells him that all other means have been exhausted; and I would have the physician assume everywhere the rôle of an immunisator; and I would have him defer handing over his patients to the surgeon until he has tried, in every case of localized bacterial infection which is unassociated with immediate risk of life, the therapeutical inoculation of the appropriate bacterial vaccine."

DISCUSSION.

Papers of Dr. E. L. Keyes, Jr., and Dr. Alfred Mitchell.

Dr. Keefe, Providence, R. I.: I have been much interested in both papers, and certainly Dr. Keyes has given us a complete analysis of cases of tuberculosis of the testicle. I will mention a case: young man who consulted me for swelling of the left testicle, he having had his right testicle removed for suppurating tubercular disease. He was advised to make his home in Colorado. He went within a short time. One year ago, some fourteen years since he was affected, he reported himself in good health. To the left testicle nothing was done in the way of an operation. With reference to tuberculosis of the bladder, I will mention the case of a young woman who consulted me for frequent and painful urination, and who had blood and pus in the urine; no tubercle bacilli were found at any time; the sediment from the urine was injected into a guinea pig and it afterward developed enlarged glands which were shown on examination to be tubercular in their nature. That patient I treated with topical applications and hygiene. With the cystoscope we could see ulcers in the bladder. I treated those ulcers with nitrate of silver and formalin. After a period of three months these disappeared and have not recurred. The cystoscope was that of Kelly, used with admission of air. Whether the admission of air into the bladder may do some wonderful work as admission of air into the peritoneal cavity in tubercular peritonitis, I do not know. I wish to report a case of papilloma of the bladder. This patient entered the hospital as having a tubercular disease of the bladder. I also mention it because of the novel method of the operation—the aid the cystoscope gives us in such an operation, and also because of the free abdominal section I made previous to the removal of the papilloma. Patient, mill hand, 66 years old; his trouble was diagnosed as tuberculosis of the kidney, for which he was advised to have an operation. He entered the hospital in February, 1904. His trouble presented four distinct symptoms: pain in the back, in the left lumbar region, extending along the left ureter, frequent urination, hematuria of an intermittent character. He had lost flesh to the amount of forty-two pounds. In addition to the above, the patient said he had frequently passed gravel. There was some tenderness over the bladder. On March 2, 1904, a preliminary urethrotomy was done, after which a cystoscopic examination of the bladder was made. A villous growth was found near the opening of the left ureter. Both ureters were catheterized, the urine from the left containing a small amount of blood, probably due to the instrumentation. On March 29, a second cystoscopy was done, and the left ureter catheterized as a guide. An incision about three inches long was made into the general peritoneal cavity, the peritoneum was stripped from the posterior wall of the bladder by operating through the pre-vesical space until the growth was reached. An assistant looking through the cystoscope directed the operation through the bladder to the growth. The growths removed, the incision in the peritoneum was sutured, closing off the general peritoneal cavity from the pre-vesical space. The bladder wall was sutured in layers with fine chromic gut, as Dr. Cabot advises. Then the abdomen was sewed up in layers, and a drain of iodoform gauze left in.

Pathological examination showed the growth to be a papilloma.

Dr. Hugh Cabot, Boston: I think we are much indebted to these gentlemen who have come from a distance. For my part I fear I can add but little, particularly when other gentlemen are present whose knowledge is greater than mine. A few notes in regard to the multiplicity of lesions in genito-urinary tuberculosis. This is comparable to the multiple lesions in bone tuberculosis. Orthopedic men hold that the multiplicity of lesions does not make it unwise to act upon an active lesion. I have seen reason to believe that the same holds true of the genito-urinary tract, and that in spite of the multiple lesions, operation may be undertaken for an active lesion which can be reached and which seems to be hurting the patient. After removal of a suppurating epididymis the general tuberculosis improves under treatment which is not different from that employed before removal. Dr. Keyes has spoken of the relation of tuberculosis to gonorrhea. As I have seen it the difficulty has seemed to me that we are likely to become confused in the diagnosis, and as I have seen patients from one service to another, I have found several whom I have accused of a gonorrheal process which at the next service was found to be tuberculosis. We are apt to confuse the tubercular lesions with the gonorrheal. They are frequently very difficult to distinguish, and we are apt to jump at the conclusion that if a man has a gonorrhea, that an epididymitis is more likely to be gonorrheal or a mixed infection than tubercular. Personally I have regarded these patients as tubercular more frequently. Hydrocele I have found a serious stumbling block. I have tapped hydroceles and found a year later that the condition was tubercular, and yet there was nothing about that epididymis at the time to convince me that it was tubercular. I have seen a number of hydroceles following trauma and allowed them to quiet down, and which ultimately were found to be tubercular, and were tubercular in the beginning, the hydrocele being stirred up by the trauma. Pus from the suppurating foci in the testicle—that has been misleading in many cases I have seen; misleading in a negative way, misleading in that it has been sterile. I confess that I have not regarded the pus from sinuses of great value. In regard to the hygiene treatment of this class of cases, I must be guilty of being brought up in the conservative school and I have not seen reason to depart from it. I remember one patient of my cousin's with extensive double epididymitis on whom it seemed to me suicidal not to operate. That boy was sent to Maine to a lumber camp and he wrote letters showing that he was not satisfied with his progress. Later the letters ceased. A year later I saw him; the disease has not recurred. I do not believe the diagnosis was a mistake. I think that was a case of tubercular epididymitis and I have no doubt that he is free from the disease in the epididymis, and I have never found it elsewhere. In regard to castration, I saw last year an interesting case that was operated upon 12 years ago by Dr. Harrington, a double castration done and apparently permanent cure obtained, although the history of that time strongly suggested involvement of the prostate and base of the bladder. The cystoscope was not employed at that time; but the bacilli were found in the urine. The man to-day is apparently well, but the operation was done before puberty, and he shows the peculiar changes which are sure to follow castration at that time. I am not sure that was bettering his condition. In regard to double epididymectomy I am much pleased to hear Dr. Keyes take the position he does. Although I have had no personal experience with it, it appears to me the most sane operation we have. The progress of the disease shows that the testicle is less liable to the disease or shows a greater degree of ability to fight it off. The involvement of the testicle is always later than the detectable epididymitis and the results appear to show that the testicle is able to shake off the disease permanently to a degree which does not exist in the epididymis. Double castration seems to me such an unfortunate operation that if any operation shows better results—and I think double epididymectomy will—we are justified in doing that. We are justified in doing an operation on the epididymis in conditions of sterility when orchidectomy would not be a proper operation. In regard to the lesions of the bladder and prostate I must confess to an abiding skepticism as to primary tuberculosis of the bladder. I have not seen a case that was convincing. It seems to me inherently improbable. Dr. Mitchell mentions the examination of the urine for tubercle bacilli. That seems to me an overestimated means of examination; very many slides may be examined and nothing found. On the other hand a short examination may show a bacillus which shows all the characteristics of the tubercle bacillus, but which is not. Two good bacteriologists have been deceived by such cases showing the bacilli in the urine. Case of a boy who, following gonorrhea, had a contracted bladder and hard, nodular prostate; tubercle bacilli were found in that boy's urine by a bacteriologist thoroughly competent in every respect. His seminal vesicles were removed—that is to say, parts of them were removed containing typical lesions which were not tuberculosis; complete recovery has taken place. It would take more than the examination of any bacteriologist to convince me that that examination was not correct.

Another case in which a man made the journey from San Francisco to Boston. He showed sparkling urine; but with very careful examination by a gentleman of some eminence tubercle bacilli were found. He did not have tuberculosis. All this trouble might be saved, it seems to me, by the use of guinea-pig inoculations, which are far safer and not liable to the same errors.

In regard to the use of the cystoscope in lesions about the neck of the bladder: We must ask whether the use of that instrument is apt to give us knowledge with which we can treat the patient better. When used in cases in which there is involvement of the prostate, it is likely to make the patient much more uncomfortable, and probably does not add to our knowledge of the disease. On the other hand, where the disease seems to come from above and it may be possible to abolish it, then the use of the cystoscope is to be advised. Its careless use is bad. In regard to the use of drugs: Urotropin by its longer name has been mentioned. I have seen cases in which urotropin has made patients worse, in that the patients became afflicted with frequency and great pain. I doubt that it does good in tuberculosis. On the other hand, santal oil has seemed to me to make them more comfortable, and where it does not disturb the stomach it does good in relieving tenesmus. In regard to operation on the prostate and seminal vesicles: It seems to me here, as in disease of the testicle, we must err, or we must try to err, on the conservative side. Draining abscess of the prostate is obviously wise. To attempt to abolish disease involving the prostate and vesicles is likely to give bad results, not likely to improve the condition of the patient, and should only be undertaken under the greatest provocation. It is too radical an operation, and it does not seem that it would give us anything in the way of results.

Dr. Watson, Boston: I do not quite see what there is left for me to say. I suppose I have learned more from Dr. Keyes's father than from any one individual. What occurs to me to say is this: In regard to tuberculosis of the testicle, more especially of the epididymis, I will quote a remark from Dr. Henry J. Bigelow. I saw a man in the Mass. Gen. Hospital wards, with tubercular disease of the testis, and Dr. Bigelow said to him, "Sullivan, don't you think it is time to hang up your fiddle?" "My God!" he said, "if my old woman was here I would give her hell!" He got better and became or was a cab driver. He finally died of pneumonia. The case to me has been the enforcement of the lesson of climatic treatment. I have known a great many cases who have been relieved of pulmonary tuberculosis and tuberculosis of other parts of the body. I am therefore strongly in favor of the efficacy of climatic and hygienic treatment, which you may sum up in the words, "sucking up air," sleeping out of doors and eating well. It is undoubtedly a most efficacious remedy. I am conservative, as Dr. Keyes and Dr. Cabot are. But here is conflicting testimony. Bruns' cases show good results after castration, and there is no doubt of their accuracy. And what are you going to do? I know of certain cases getting well with climatic treatment. I have had many get well with castration so far as a temporary cure is concerned. I have had many tuberculosis cases start up quickly after castration and I have not liked it. Frankly, I do not know whether I am advising the man rightly or wrongly in telling him to be castrated. I am in doubt; there was a time when I was not. Now one other thing in which I do not quite follow Dr. Keyes, if I have got him right. As I understand him he says that he regards a tubercular lesion, whether in one or both testes, as inevitably but one part of other tubercular processes latent or otherwise in the body. Am I right? [Dr. Keyes replied "Yes."] I can not see it that way. It is not true by autopsy, it is not true by clinical experience, and it is not true in bone tuberculosis, and it is not true in renal or in pulmonary tuberculosis. Why should it be true in testicular tuberculosis? Dr. Councilman says to me that we are learning all our pathology from surgeons, but I do not see how we are going to get around that fact. The disease is in one testicle; Dr. Keyes says there is latent tuberculosis in other parts of the body. How do we know it? Autopsy does not show it, or it does not show it convincingly. Where it does not show it, is it worth anything? I have eleven patients whom I have followed, in whom I have seen a process starting localized in the epididymis; the process has extended to the testicle, and in one case there was inguinal adenitis. They clinically show nothing else.

In Boston we have had a primary tuberculosis of the prostate, as shown by Dr. Crandon, in which the pathologists raked that body from beginning to end and could not find any other focus of tuberculosis. I do believe Dr. Keyes' dictum is wrong there. Much hangs on it. If it is true, and if you do get a large percentage of cures from early castration, then you must regard that thing—the testicle—as a thing to be cut out. The evidence is conflicting. I may say that when I see a case of tubercular disease of the bladder in an ascending infection I feel like throwing up the sponge quickly. When it comes from the kidney, your treatment is to take out the kidney, and that is the best treatment there is, and it does cure some of the cases. I have got a young girl with tuberculosis of both kidneys, one of which is discharging no pus, and the other discharging pus into the bladder, and that girl has ulcers of the bladder. She has got temporary relief from nephrotomy; that girl's bladder is better.

In regard to ascending tuberculosis. I have never put in these strong solutions of corrosive sublimate. I know they hurt like thunder, and I should think you would need a large dose of morphine. One to one thousand strikes me as just as good as a red-hot poker in the urethra. I have seen nitrate of silver prove very irritating also.

The question is—if you have a tubercular testicle, is there tuberculosis elsewhere or not?

Dr. Balch, Boston: I can simply say that my experience in the conservative treatment of tubercular cases agrees with Dr. Hugh Cabot's and with that of Dr. Keyes. I have had more success in that than I have had in the other. My experience has not been very large; not large enough to give any firm belief.

Dr. Garceau, Boston: Dr. Keyes mentions that tuberculosis of the lower urinary tract is almost invariably, if not always, associated with tuberculosis elsewhere in the body. It is also true of the kidney. I believe that all cases of kidney tuberculosis are associated with some lesion elsewhere in the body. Some years ago I made some investigations of this subject, and looked through the autopsy reports of the Mass. General and Boston City Hospitals. I examined over three thousand cases, and found twenty-four cases of caseous tuberculosis of the kidney. They were all without exception associated with some lesion elsewhere. In regard to the treatment of tuberculosis of the bladder in the female: This is a far different proposition from the treatment in the male. With the Kelly cystoscope we can explore all parts of the bladder and make applications with nicety and treat it as if it were a skin lesion. I cannot agree with the statement that was made about nitrate of silver. I think nitrate of silver is the most valuable remedy in the treatment of that disease. The trouble has been that it has been used in the wrong way. It has been applied to parts of the bladder which were not affected. It should be applied to the ulcers and to nothing else. Lesions which show hyperemia are made worse by it, but applications of the fused nitrate of silver on a probe do the greatest possible good, and it is possible to eradicate the disease from the bladder if combined with other methods of treatment. The Guyon treatment I have found of the greatest value. The treatment should be carried on presumably by the physician, but it can be carried on by the patient herself. The drops are injected into the bladder very slowly. I have used as high as one to five hundred solution of corrosive sublimate. The patients become accustomed to the remedy, and can stand it with the greatest ease.

Cystotomy: here we have a remedy of the greatest value. Let me relate a case to illustrate the point. Three years ago a patient came to me, a girl, about 28 years old, who had tuberculosis of the bladder. So far as I could see and determine by examination, the upper passages were clearly normal. I started her with the Guyon treatment and with applications of silver nitrate in the office. She was a working girl, and it was essential that she should have sleep at night. I came to the conclusion that she must have a cystotomy. I did a vaginal cystotomy, and fitted her with a rubber urinal which collected every drop of urine she passed. She was perfectly comfortable in the daytime, and slept well at night. She gave herself the treatment with corrosive sublimate at home, and in two years she was well. The bladder had entirely closed up, and I closed up the fistula. There was a contracted bladder which I dilated with hydraulic pressure. She holds her urine about four hours, has to urinate every four hours. She is comfortable, beyond a feeling of fullness in the bladder causing a desire to urinate, and reminding her of her old trouble. There is no pus in the urine, and she is to all intents and purposes well. I would advise cystotomy in certain selected cases. I am a firm believer in the hygienic treatment, and think, if the patient can afford it, the best thing for her to do is to place herself in a sanitarium and try the rest cure there. In regard to the question of primary tuberculosis of the bladder, I understood Dr. Cabot to say he had never seen a case of primary tuberculosis of the bladder. Do you mean it must be primary in the bladder? I mean that there was no other focus in the body. Given a patient who comes to you with tuberculosis of the bladder in whom the rest of the tract is not involved: a patient who does not present any demonstrable lesion of tuberculosis; it seems to me that it is fair to say that it is primary in the bladder. Dr. Watson has told us of a case of primary tuberculosis in the prostate. Tuberculosis attacks every tissue of the body, and the bladder has been up to this time supposed to be not in any case the seat of primary tuberculosis. I do not think this is proved.

Dr. Chute: There are two or three points. One of them is cyto-diagnosis of the hydrocle fluid, and whether we agree with Dr. Keyes that none of them ought to be operated on, or with Burns' idea, we ought to know what the lesion is. In those cases it was found, as Tuffier found in 1901, that the same conditions are in the hydrocele fluid as in the pleural fluid. That is, there is a tremendous excess of lymphocytes, 97 per cent., one or two per cent. of endothelial cells, and one or two per cent. of pus cells in tuberculosis. But this case of mine shows that you get the same thing in other chronic inflammations. The cyto-diagnosis does not rule out syphilis from tuberculosis. Perhaps it rules out malignant disease; we do not know. The other hydroceles—post-gonorrheal and mechanical hydroceles—show entirely pus. It seems to me that in those cases in which we want to make a diagnosis of this thing, it is going to afford us a considerable amount of benefit. As to what has been said about the finding of tubercle bacilli, it seems to me that you may find acid-fast bacilli in catheter specimens, and it is necessary to prove them tubercle bacilli; but we do not find them so often in catheter specimens. I have been told that it is very likely that in old cases of tuberculosis the bacilli change in their staining characteristics so that they are no longer acid-fast.

Dr. Mitchell spoke of tuberculin in genito-urinary work. It has this definite limitation: You have got to be mighty careful in using it if you have a kidney involvement. If both kidneys are involved it is extremely dangerous. Two cases have been reported in which anuria came on and the patients died very promptly, presumably because of the anuria. We have heard something about the cystoscopic picture in tuberculosis. I do not believe there is anything definite in the cystoscopic picture in tuberculosis. It varies a great deal—you get submucous tubercles, and you may get red striations, and I do not say that there is any typical picture.

As to Dr. Keyes's statement that tuberculosis of the testicle is part of a disseminated tuberculosis, there was a thesis published by Cassert in 1895. A case was mentioned by him of tubercles limited to the tunica vaginalis.

Dr. Lincoln Davis: In regard to finding tubercle bacilli in the urine: I feel very much the way Dr. Cabot does. But a little while ago I tried various differential stains for distinguishing the smegma bacillus from the tubercle bacillus, and found that though it worked in a few stains of smegma bacilli there was no way of telling it (tubercle bacillus) from the acid-fast smegma bacillus; though you are perhaps safe in a catheter specimen. We ought to use the guinea-pig test. Two men in Philadelphia have reported a number of cases in which acid-fast bacilli have been excreted from the kidneys in cases of phthisis and tuberculosis of other organs through healthy kidneys. Two of their cases were proved at autopsy. That was a startling thing to me. This was a preliminary communication of theirs, and they are going to do some further work on it. If that is true, and there is a tubercular process in other parts of the body, as in the lungs, and tubercle bacilli can be excreted through the healthy kidney, that is a subject we ought to study out further. In my work at the Mass. General Hospital I have been impressed by the work of Bruns. I do not know the end results after operation there. I have the addresses of the patients in the hospital who have been operated on, and I intend to look them up.

Dr. O. C. Smith, Hartford: Certainly if it is true that recurrence is the rule, it is a serious matter to do castration. I want to say that from our work at Hartford we are quite likely not to have metastases. However, if this Society does nothing more than to establish research and go back and look up our cases for the end results, it will be a valuable contribution.

Dr. E. G. Keyes, Jr., (closing): I am sorry none of you have been able to give me any light on one point, namely, whether a patient with tuberculosis of one testicle is usually or always sterile and permanently sterile. It seems to me that they are sterile, and in speaking to men in New York I have not been able to get any clinical evidence to the contrary. I should like to say a word about injections into the bladder of silver and mercury. The strong injections have been advised by some of the speakers. I have never done them, but if you get a patient to stand them, they will do good. I have used very mild solutions, and found the results marvellously good. I have used one to twenty-five thousand solution of corrosive sublimate in the bladder. You would not suppose it would have any effect on a deep-seated lesion, and yet I have seen very beneficial effects. I agree heartily with the belief that if you get along without touching the bladder, so much the better. But in those cases in which the patient is racked with frequent urination, I have seen very good results achieved by these mild solutions of corrosive sublimate. So that I think the mild solutions do better than the strong ones. I have seen one cure from instillations of thallin sulphate, and I have seen a case diagnosed by Dr. Van Buren in the '80's, and who came to me, and who was markedly benefited by mild injections of bichloride of mercury.

The most interesting point of all is that brought forward by Dr. Watson as to whether the tuberculosis is primary in the testicle. I am perfectly sure that many tubercles may remain in some gland and give no evidence of existence anywhere else in the body except that in all the cases I have seen there has always been a little pus in the urine and a little pus to be expressed from the prostate, while the focus in the testicle was active. That might be a congestion analogous to what occurs at the mouth of the ureter in kidney tuberculosis. I have known so many cases to relapse when one testicle was involved. That testicle was removed promptly, and yet the process got into the other testicle. I think that is confirmatory of the belief that there is always some disease of the internal genitals, and yet that might not be present. I have very grave objections to following up that theory and taking out the first testicle and guaranteeing the patient that he will not have a tuberculosis of the other testicle. I have no doubt that there was tuberculosis of the prostate. Whether that tuberculosis of the prostate was so slight that it would not show any signs at autopsy or not, I believe it was there. I think the danger of relapse in unilateral castration is so sure that the clinically important fact is not to guarantee that you can take out one tubercular testis without relapse in the other. I agree with Dr. Cabot in the illustration of bone tuberculosis.

DR. MITCHELL (closing): The use of tuberculin: I have been recently conversing with one of our Bowdoin surgeons who returned from London, and who had opportunity to observe Wright's work. He was greatly impressed with the efficacy of the treatment. Some of the cases seemed to show remarkable results from the use of tuberculin, keeping the opsonic index under constant watch as a guide.

BOOK REVIEW

Conservative Gynecology and Electro-Therapeutics. A Practical Treatise on the Diseases of Women and Their Treatment by Electricity. By G. BETTON MASSEY, M. D. Fifth Revised Edition. Illustrated with Twelve (12) Original Full-page, Chromolithographic Plates, and Fifteen (15) Full-page Half-tone Plates, All Photographs Taken from Nature, and Numerous Engravings in the Text. (F. A. Davis Co., Publishers.) Philadelphia, 1906.

Dr. Massey has for many years been one of the chief exponents of electro-therapeutics in the treatment of gynecologic affections, and the present work, a volume of some 450 pages, represents a résumé of his opinions on the subject, and also gives an account of numerous cases which he has treated. Besides this there is a chapter devoted to various kinds of electric apparatus, with instructions for their use. The book is well gotten up and the arrangement of the subjects is excellent. The type is clear, the illustrations are good.

Dr. Massey is an enthusiast, and a perusal of the pages which he has written fully carries out this opinion. On reading the book one cannot help getting the impression that electricity is the one and only method of treatment of all gynecologic affections, and that it must be tried before resorting to any other therapeutic agent. Most of those who have given electricity a fair trial, as has the writer of this criticism, while not denying the occasional advantages which may be derived from the use of this agent, yet, in the light of experience, have been forced to conclude that electricity of itself has not maintained the position which was expected of it at the time when Apostoli and others first urged its use. Take, for instance, the question of treatment of fibroid tumors of the uterus by electricity. Some twelve years ago it was the writer's good fortune to be in Paris and to follow closely Apostoli's clinic which was at that time under his personal supervision, and to see a large number of cases of fibroid tumors treated by this method. The opinion which he then formed was that electricity was a palliative, but not a cure. This opinion was confirmed by studying the end results of Apostoli's own cases. One day he asked Apostoli to show him reports of cases actually cured by this method. Old records were gone over and many cases were brought forth as illustrating absolute cures. On looking, however, at the headings of the individual records it was found that in every single instance in which hemorrhage had stopped coincidently with the decrease in the size of the tumor, the patient had reached an age long past that of normal menopause, all of them being beyond fifty years of age.

The reading of the cases which Dr. Massey gives at the end of his book, to the number of 110, likewise discloses the fact that many of the "cures" have reached a well-advanced stage of life, no less than twenty-three of them being beyond the age of fifty years, at a time when many fibroids cease of themselves without any special treatment, to give any further trouble. Many of the other cases recorded are classified as "practical cures," the words "practical cure" apparently meaning that for a longer or shorter while the tumor had not given any trouble. There are also uncertain statements in regard to the ultimate condition of the patient, as reported, for instance, on page 172 we read, "she reported recently that the tumor had disappeared." Just how she ascertained that she had no further tumor is not apparent.

There is an entire absence of anything in the book which relates to the unfavorable effects sometimes produced by electricity—the pelvic peritonites occasioned by blind punctures, the softening and abscess formation resulting from the continued electric treatment, etc. We believe that there are few physicians so hardy and oblivious of dangerous sequelae who will deliberately, as is advised on page 164, plunge a needle blindly through the abdominal walls, and necessarily through the peritoneal cavity, into a fibroid tumor beneath. Dr. Massey italicizes the remark: "It need scarcely be said that no punctures should be made at any spot that might be covered by intestinal convolutions." How this is ascertained does not appear. In these days the cautious surgeon has thrown away the aspirating needle, preferring an incision to blindly plunging a sharp-pointed instrument into the body.

The position of most gynecologists to-day is that electricity, in the treatment of fibroid tumors, should be limited to patients who are physically unable to withstand the effects of a serious operation. Electricity certainly relieves pain in some instances, and arrests hemorrhage. A patient with a weak heart had better trust to electricity in the hope of having the tumor undergo natural atrophy at menopause, rather than subject herself to the knife. In these days, when the mortality of hysterectomy is so very slight in experienced hands, it is better to submit to operation than to drag along with a large tumor, which in the end undermines the system, and not infrequently is the precursor of malignant degeneration.

In nervous cases, with a strong hysteric or neurasthenic element, electricity properly and scientifically applied undoubtedly is of great advantage, and in the chapter bearing on these diseases, Dr. Massey has given safe and good rules to follow. How much good electricity of itself actually does in allaying symptoms and causing their disappearance, is very questionable. There is undoubtedly a strong hypnotic element in this method of treatment. The sight of a well-equipped office for electric treatment is undoubtedly a great mental stimulus.

There is a short chapter on the treatment of benign tumors of the breast by electricity. As our knowledge of tumors increases, any tumor of the breast, no matter how small, should excite grave alarm, and while not advocating radical cure by surgical means for all breast tumors, yet it must be borne in mind that early operation with thorough removal is the surest means known to-day of eradicating this form of disease in the breast. Too long a time spent in futile electric treatment of these apparently benign tumors may result in an unfortunate ending. We are inclined to believe that Dr. Massey must stand alone in the opinion that early stages of mammary cancer can be effectively cured by "cataphoric destruction and sterilization." Most of the cases reported either had unfavorable end results, or else the time at which the report was made was too short to allow of any positive deductions. One case was mentioned as having been cured, but as no histologic examination had been made it is fair to presume that the disease might not have been cancer.

E. G.

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THE ETIOLOGY AND DIAGNOSIS OF SPERMATOCELE WITH A REPORT OF THREE CASES.

By Charles M. Whitney, M. D., Boston, Mass.

CYSTS containing spermatozoa are of sufficient rarity to warrant a report of all cases which have been observed and for that reason I wish to present to the Urological Association three which have come under my observation, and consider with some care the causes that render their occurrence possible.

That these cases are rarely met with is shown by the small space given to a consideration of the subject in the best known text books on genito-urinary diseases. To one who has not seen one of large size the inference is that they are small, are attached to the epididymis and cause no especial difficulty in diagnosis. That they may be so large as to present symptoms of a hydrocele, from which they must be differentiated, is not so clearly stated as to impress the fact upon the mind of the student or practitioner, who does not see many cases of this kind. The cases which follow illustrate quite well this aspect of the subject, as they were all of large size, differing in no way from an ordinary hydrocele, and in all of them a diagnosis of this condition was not made until the character of the fluid removed showed that they were spermatoceles.

Case 1. A. H. A., 40, married, by occupation a driver of a delivery wagon, was referred to me, by the kindness of Dr. Robert R. Culbert, for advice regarding a swelling of the right side of the scrotum. His family history was negative. Ten years before, in jumping down from his wagon, he slipped and came down astride of the shaft, striking the right side of the scrotum. This at once caused him great pain and was followed by marked swelling of that side, with ecchymosis. This subsided slowly and left the affected side swollen to about twice the size of the other. This caused him little, if any, discomfort until a year ago, when it began to slowly grow larger. He then had a dull pain in this region most of the time. At the time of my examination, April 20, 1904, the right side of the scrotum was occupied by a swelling somewhat larger than a goose egg, elastic in feel, not tender, and at the lower part and in front the testis was present. There was no impulse on coughing and the swelling did not extend to the inguinal opening. There was moderate translucency. The accompanying photograph, which I was fortunate enough to secure, shows most excellently the condition then present. A diagnosis of hydrocele was made and a trocar was inserted, which was followed by the escape of twelve ounces of a fluid resembling barley water or thin milk. After withdrawal of this fluid the testis and epididymis appeared normal. The following day the scrotum again swelled and became exceedingly tender and painful, so that he was unable to work. This subsided in about a week and the disease has not recurred up to the present time. By the courtesy of Dr. Culbert, I had the opportunity of examining the patient with him on June 2, 1906, and found the testis was normal. There was no tenderness about the epididymis, but at its head there was a slight swelling, very soft and elastic, suggesting a small quantity of fluid in the cord, but so small that it was impossible to say positively that it was there.

I am indebted to Dr. Timothy Leary of Tufts College Medical School, who very kindly made the pathologic examination of the fluid, and whose report is as follows:

"Received about nine ounces (275c.c.) of a cloudy white aqueous fluid which foams readily and which on standing deposits a fine amorphous opaque white sediment, forming a layer 2mm. deep on bottom of bottle and leaving an almost colorless opalescent fluid above. Microscopical examination of fluid reveals enormous numbers of spermatozoa, most of which are well proportioned and well preserved. Here and there are found elements which have lost a portion of the tail and others which show hydropic swelling of the body, but for the most part the sperma-

PLATE I.—To Illustrate the Article by Dr. Whitney.

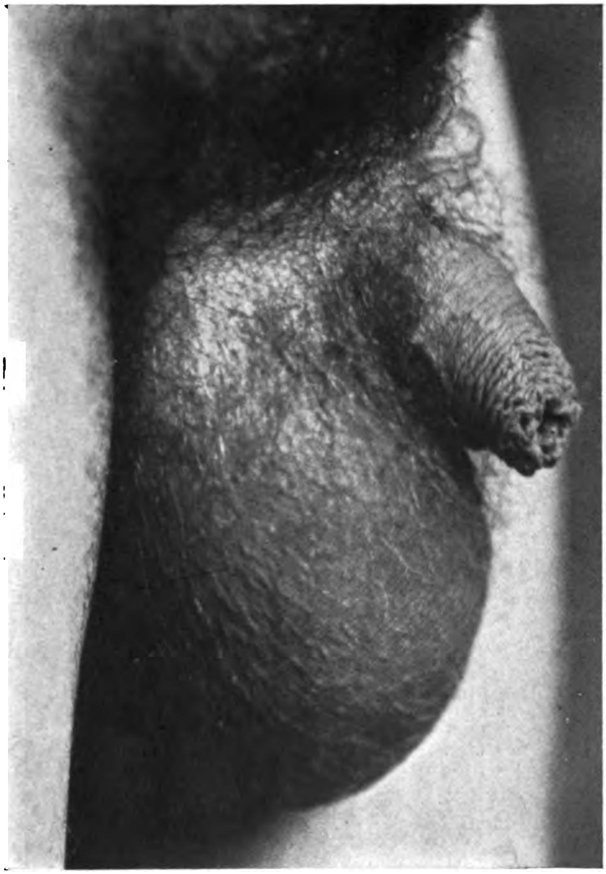


FIG 1.

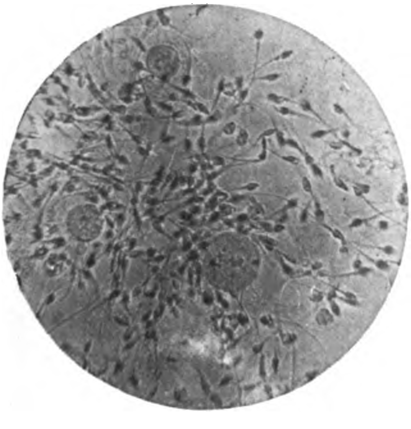


FIG 2.

tozoa are morphologically perfect and stain normally. Cells occur in considerable numbers throughout the fluid. They usually show extreme fatty changes, but small cells of the lymphocyte type and larges cells corresponding to epithelial cells (testicular and epididymal) are distinguishable. Free fat drops occur rarely."

I am also indebted to Dr. A. E. Austin of Tufts College Medical School, for the chemical examination, his report being the following:

Water	98.5%
Residue	1.5%
Ash	.0048%
Globulin	.28%
Serum Albumen	.33%

This analysis places this fluid very clearly among the spermatocele fluids on account of the small amount of residue which it contains. Furthermore, it is colorless, does not coagulate spontaneously, and has a very small amount of solid residue. As compared with hydrocele fluid, we find the latter to contain on an average 6.11% of residue with globulin amounting to 1.32% and serum albumen to 3.59%.

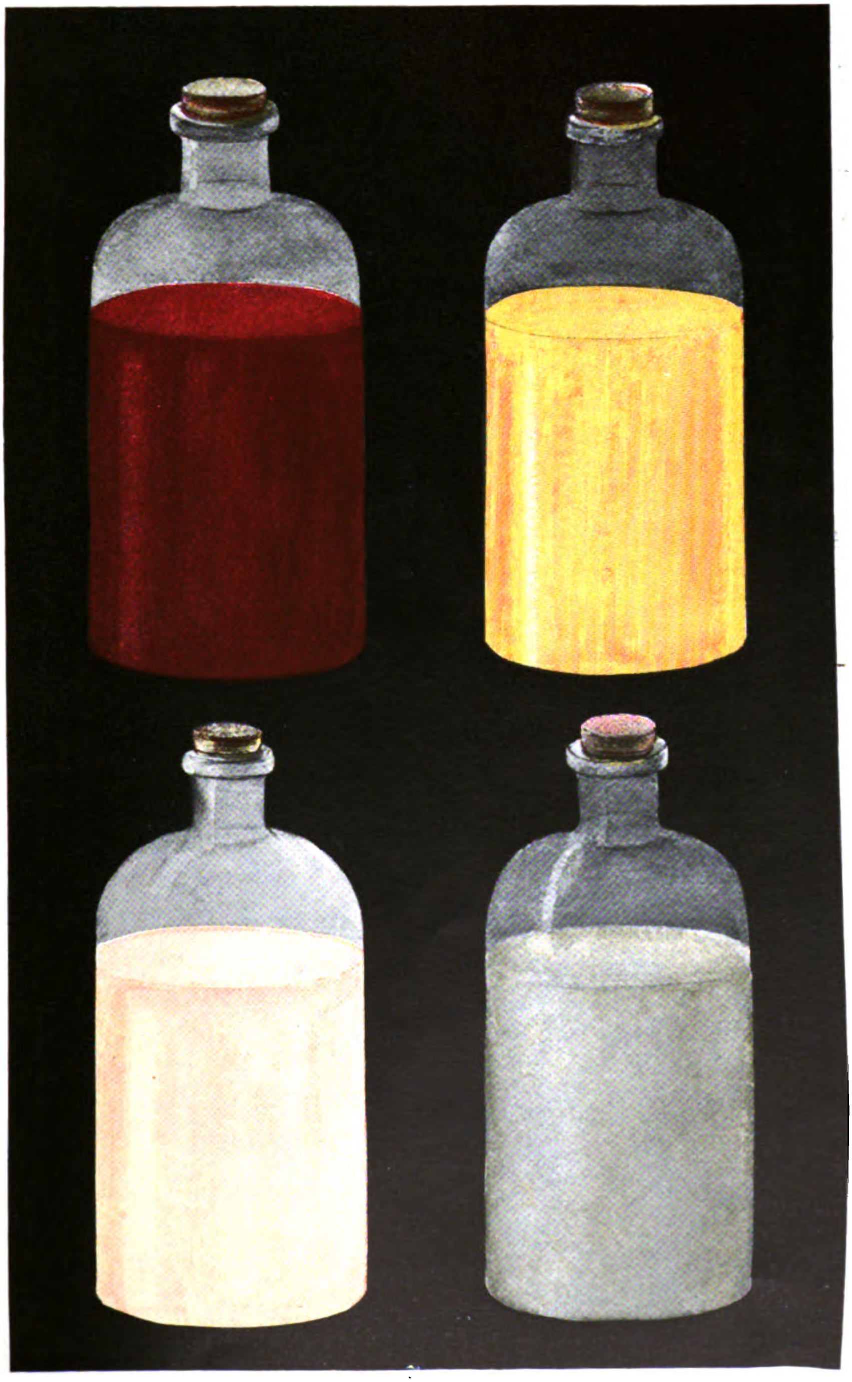
Case 2. N. J. R., 56 years old, married, employed as a pilot on a ferry boat, was referred to me on June 3, 1900, by Dr. W. A. Morrison. His previous history showed nothing of interest; he had been a sailor, and had contracted smallpox, typhoid and some fever, probably malarial. There was no venereal history whatever. For some years previous to the appearance of his present ailment, he had been in perfect health. He does not remember having received an injury in this region, except that about six months previous to his noticing the swelling, he was kicked in the right groin, which was followed by some lameness, but by no tenderness of the scrotum.

During the latter part of 1898, he noticed that the right side of the scrotum was slowly enlarging, without giving rise to any pain or tenderness. On Feb. 5, 1899, he was tapped and he estimates that a pint of fluid was removed. In three days it refilled and it was again tapped and a couple of ounces of what seemed from his description to be bloody serum was removed. It then subsided and very slowly refilled and at the time of my first examination, over a year later, it presented a swelling on the right side of the scrotum the size of a goose egg, smooth, elastic and fluctuating. There was no impulse on coughing, no tenderness, and little if any translucency. Introduction of a trocar was followed by the escape of eight ounces of fluid resembling barley water. The testis was apparently normal, but the epididymis slightly thickened at the upper portion. The fluid removed was slightly albuminous, and contained many spermatozoa, which established the diagnosis of spermatocele. Directly following the tapping, the scrotum again swelled and became very tender and painful, and on his return on June 11, the swelling was nearly its original size. He was put to bed where he remained a week, and constant hot applications were used. From that time the symptoms gradually subsided, the swelling slowly disappeared until at the end of six weeks the scrotum had resumed its natural size.

Since then there has been no recurrence of the disease. On May 29, 1906, I requested him to report to me for examination, and I found no swelling of the scrotum present. Both testes were normal in consistency, but at the head of the right epididymis was a small elongated body apparently separated from it and behind the testis, having a small pedicle close to the head of the epididymis. In the center of the epididymis there was a small area which was quite tender. On the left side in a similar situation was a small round body apparently a cyst about the size of a cherry.

CASE 3. P. Mc. C., 33, single, laborer, appeared at the genito-urinary clinic at the Boston Dispensary in May, 1902. He had observed a gradual enlargement of the right side of the scrotum for about six months. Except for an attack of gonorrhea three years previous to his visit, his history was negative. He had never received any injury in this region. On examination, the right side of the scrotum presented a swelling of the size of a large hen's egg. There was no impulse on coughing, it was smooth, elastic and not tender to pressure. It was not examined regarding translucency. A diagnosis of hydrocele was made, but after tapping and the removal of about four ounces of fluid resembling cocoanut milk its true nature became apparent. The testis after removal of the fluid showed no apparent abnormality, but the epididymis was slightly thickened, especially toward the head. A microscopic examination of the fluid showed the char-

PLATE II.—To Illustrate the Article by Dr. Whitney.



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acteristic appearance, many spermatozoa being present. Except for a test for albumen, which was absent, no further chemical examination was made. As he was not seen again his further history cannot be given.

Feeling that perhaps my experience had been less fortunate than others in meeting with these cases, I have questioned several surgeons of long experience and extensive clinical opportunities along genito-urinary lines, and have found that while they had seen collectively several hundred cases of ordinary hydrocele they had seen very few cases of spermatocele. I have therefore deemed it worth while to carefully review the literature of this most interesting subject, and with the kind assistance of Dr. Leon S. Medalia, I have studied the bibliography of the past sixty-three years, and in all cases have obtained the facts from the original articles, and not from abstracts which are often subject to error. Previous to 1843, the term spermatocele was used to designate certain swellings of the testes probably inflammatory in their nature. In the classical work of Curling, which was published in 1843, he describes under the name of encysted hydrocele of the testis certain " adventitious cysts distinct from the sac of the tunica vaginalis investing the epididymis, especially at the head." He states further that while the cysts usually contain a limpid serum he has found them to contain fluid of a milky hue. In connection with this form he mentions that the fluid contains little or no albumen and that it does not coagulate by heat or by the action of acids. His pathologic findings are clearly described and several wood cuts are shown.

In this description of sixty-three years ago, written by a master of his subject, showing as it does the presence of extra-vaginal cysts, usually of small size, filled with a milky, non-albuminous fluid, what is wanting but the microscope and a name, to make it the earliest and clearest account of the disease in question?

Considering the number of years, the amount of literature is exceedingly small, and I am indebted to the scientific and carefully written article by Poirier[2] for a portion of the historical facts regarding this subject. Spermatozoa were found for the first time in these cysts by Liston[3] and Lloyd[4] in 1843, and as these cases mark an era, and as these observers first blazed a path which many others have followed, I will relate them in some detail.

Liston's first case was at an age beyond middle life, tumors of scrotum present on both sides. Largest cyst was punctured and from eight to ten ounces of fluid obtained which might be compared to distilled water with a little soap diffused through it. The other cyst punctured a few months after showed clear serum. A short time afterwards, the same patient presented himself with the original tumor refilled, which was punctured; the same amount of fluid was obtained. Chemical analysis showed that it contained hardly any albumen. The next day some of it was examined under the microscope and numerous spermatozoa were found.

His second case was a man of fifty-three. A small cyst was present above the testis. The fluid was nearly transparent and contained spermatozoa. He makes the observation that, before the above two cases, he had often met with cases containing a limpid fluid, he had punctured some repeatedly, had attempted a radical cure of others by incision, tents or seton, but had contented himself with examining the fluid by heat and nitric acid, in short chemically. Lloyd, whose article closely followed that of Liston, discovered the spermatozoa contained in the fluid quite accidentally while using it as a diluent for blood in the microscopical examination of the latter. He later examined the fluid in thirty cases of hydrocele and found spermatozoa in two.

He reports three cases of this kind. He denies that a wounding of the testis in tapping has anything to do with the presence of spermatozoa, because they are rarely met with fully formed in the human testis, and never are present in sufficient amount in either the epididymis or vas deferens to yield anything like the vast number present in his cases. Next, Paget,[5] 1844, reported two cases, the first where a small cyst containing two drachms of opaque fluid was found in connection with a suppurating hydrocele which resulted in death. Post-mortem dissection showed that the two sacs were distinct and that the small one contained spermatozoa, granules and large round granular spermatic globules. The fluid was not albuminous. His second case was also post-mortem and showed two small cysts at the upper part of the epididymis. His explanation of this condition was that " certain cysts, seated near the organ that secretes semen, may themselves possess the same power and secrete a similar fluid. He reasons that an analogous condition is found in the dermoid cysts of the ovary.

In 1848, Gosselin[6] wrote the first important memoir on this subject, dividing the cysts into small, not containing spermatozoa and hence not pertinent to the subject, and large ones, developing outside the tunica vaginalis, between the testis and epididymis. He believes them to be due to a rupture of a semeniferous tubule into the cyst, or to obliteration and retention. He also describes them very extensively clinically. Up to this time the term used by Curling, "encysted hydrocele," was still used, but Sedillot,[7] in 1856, first originated the term spermatic cyst. He considered that they were due to a rupture of an afferent seminal tubule into a hydrocele sac. Closely following this came a thesis by Marcé,[8] 1856, with a report of three cases, and by Foucher, 1856. At this time the Wolffian theory originated, namely that these cysts had their origin in the remains of the Wolffian body, and this view was advocated by Follen, Verneuil,[10] and Geraldès. Dolbeau, 1856, after a thorough study clinically as well as pathologically, evolved the retention theory, that they were due to partial dilatation and obliteration of spermatic tubules, a theory supported by Virchow in his treatise upon tumors in 1863, and formerly suspected by Cooper. Dolbeau,[9] also, (1862), reported the results of his experiments by injecting the testicles with mercury, and the discovery of ampullary dilatations.

Roth of Bâle,[12] 1876, published a short note in which he described four cases where he demonstrated the vasa efferentia detaching themselves from the rete testis. In 1885 Monod and Arthaud[11] described their histological researches which suggested a new theory, the causative relation of senile changes in the testis.

In 1885 also, Hochenegg[13] added an important memoir to the literature of the subject. The later contributions will be discussed in considering the etiology of these cysts, or will be found in the list of bibliography.

As introductory to a discussion of the various theories regarding the formation of these cysts, a few words relating to the embryology and anatomy of this region may be of value in recalling to your minds the origin of certain fetal structures which persist and are frequent causes of this condition, I have therefore freely availed myself of the works of Gray[14] and McMurrich.[15] As you well know, after fertilization of the ovum takes place a segmentation occurs, with the formation of mulberry-like masses of protoplasm, the vitelline spheres, which are divided into the upper or epiblastic, and the lower, the hypoblastic.

These soon arrange themselves in two layers, the epiblastic growing much more rapidly and surrounding the hypoblastic so that we soon have a sac, the outer wall of which, lining the vitelline membrane, is the epiblastic, while the inner layer which partly lines the preceding, is the hypoblastic. These two layers are termed the blastodermic membrane.

Very early in the process of development, a third layer appears between these two, the mesoblast, from which are derived all the genito-urinary organs, except the epithelium of the bladder and urethra which is derived from the hypoblast.

At about the third week there appears a ridge projecting into the body cavity, known as the Wolffian ridge, and on its mesial surface a second one, the genital ridge. We have now rapidly formed the Wolffian body, which consists of three sets of organs, the pronephros with the Wolffian duct, the meso-nephros, from which is later separated the meta-nephros or primitive kidney.

The duct of Müller leads from the meso-nephros. Most of these structures undergo degeneration wholly or in part. The duct of Müller is preserved in the female, but in the male atrophies except at its upper end, forming the hydatid of Morgagni, and at its lower, the utriculus masculinum, which does not concern our subject.

The excretory portion of the Wolffian body undergoes degeneration, but portions persist at the head of the epididymis, forming the para-didymis or organ of Giraldès from the observer who first described it, and in a small elongated tubule at the tail of the epididymis near its junction with the vas deferens, the vas aberrans of Haller.

The genital portion is preserved and forms the globus major of the epididymis. In the male the Wolffian duct is wholly preserved and forms the body and globus minor of the epididymis as well as the vasa deferentia, the seminal vesicles and ejaculatory ducts. From the genital ridge is developed the testis, to which is later attached the epididymis and at this junction certain structural defects occur which have an important bearing on later cyst formation.

We have then developed as complete anatomical organs, the testis with its coverings, the tunica albuginea and tunica vasculosa, and closely attached to it at its posterior border, the epididymis. Covering both the testis and epididymis, except at the posterior surface, is the tunica vaginalis, between the visceral and parietal layers of which is the cavity into which these spermatic cysts occasionally rupture.

The testis itself is divided into lobules, from three to four hundred in number, somewhat triangular in shape with the apices directed toward the mediastinum. They contain several hundred convoluted seminal tubules having diameters of $^1/_{150}$ of an inch. As they approach the apex these tubules become less convoluted, straighter in their course, larger in size, about $^1/_{50}$ of an inch, and are called the vasa recta.

As they enter into the more fibrous tissue of the mediastinum they form a mass of anastomosing tubules, the rete testis, and at its upper end terminate in twenty to thirty tubules, the vasa efferentia. These perforate the tunica albuginea and assuming first a straight course, soon become large and convoluted, forming the coni vasculosi, of which the globus major of the epididymis is composed.

These empty into a single convoluted duct about twenty feet in length, forming the body and globus minor of the epididymis and at this latter situation becomes the vas deferens.

To explain the method of formation of these spermatic cysts, much experimental work has been done, and several theories have been advanced by various observers, which it may profit us to consider in some detail.

First. The embryonal or Wolffian, first brought forward by Follen and known by his name. As we have seen, we have as embryonal relics, situated at the head of the epididymis the paradidymis or organ of Giraldès and the hydatid of Morgagni, while below is the vas aberrans of Haller. We have also the ducts of Kobelt, not previously referred to, but described by Morris.[15] These are situated on the globus major and are remnants of the tubules of the Wolffian body corresponding in course and direction with the vasa efferentia. From all these structures cyst-formation has resulted. Vautrin[16] reports a case in which the histological findings of the walls of the cyst consisted of three layers; first, ciliated cubical epithelium; second, smooth muscular tissue, and third, connective tissue; and as these structures are to be found only in the vas deferens and vas aberrans of Haller, it clearly showed the latter origin. Demoulin[22] reports a similar case. Morris shows a very beautiful cut of a preparation from St. Mary's Hospital Museum, which demonstrates a large cyst also originating from the vas aberrans. Roth[12] reported two cases originating from vasa aberrantia and one from the organ of Giraldès or rete testis. This case was in a man of seventy-eight, who died of hydronephrosis. A cyst was found containing 190 c.c. of spermatic fluid and communicating with the testis by four to six thin tubules.

Shattuck[17] describes the pathologic examination of the right testis of an adult with the spermatic cord lying immediately behind, while between the two was a large thinly walled loculated cyst about three inches long. In addition to this there were three smaller ones which lay in front of its inferior wall. Testis and epididymis perfectly normal, and there was a well-formed hydatid of Morgagni projecting from between the globus major and summit of the testis into the cavity of the tunica vaginalis quite distinct from the other cysts and normal in size and situation. From the position and relations of this cyst he concludes that its origin was in the tubules of the Wolffian body. From these and other observations we can safely conclude that in these fetal relics cyst-formation occurs which later communicates with a seminiferous tubule forming a spermatocele.

Second. Retention cysts, a theory first advocated by Virchow. In this class of cases we include those in which there is an obliteration of one or more seminiferous tubules forming a growth of intertubular tissue, a form of sclerosis observed after middle life, and resulting in a cyst. Monod and Arthaud,[11] from a large series of cases collected by them at autopsy tables, in which the testis and surrounding structures were examined microscopically as well as macroscopically, came to the following conclusions, that the small conglomerate cysts as well as the larger ones originate at the expense of the seminiferous tubules of the epididymis and are therefore retention cysts. The pathogenesis is very probably the same in both kinds and that is the intertubular interstitial changes which take place in individuals after fifty years of age, as demonstrated microscopically in the specimens examined, increase the connective tissue, then compression of the tubules, giving rise to their obliteration, and later dilatation caused by the secretion behind the points of obstruction. This condition is analogous to the cystic formation in interstitial nephritis and in the thyroid and mammary glands.

Inflammatory changes in the testis due to gonorrhea, syphilis or tuberculosis may act in a somewhat similar manner, but such cases are very rare. A more important cause of the formation of retention cysts was discovered by Dolbeau[9] in 1862. He injected a hundred testes with mercury and found that the vasa efferentia were capable of dilatation, resulting in the formation of ampullae or diverticulae which might readily be produced pathologically whenever there was some slight alteration in the excretory canal, thereby increasing the resistance to the outflow of semen. As these enlarge, cysts of various sizes must result. It has been recognized by many observers that retention cysts are found most frequently at the location of the vasa efferentia, which this would explain.

Pietavy[28] and Rosenbach[24] report the autopsy findings of cases which they considered retention cysts, although no communication with the rete testis could be made out.

Third. The theory that cystic formation occurs from overlapping of the serous layers at the junction of the testis and epididymis has been ably advocated by Poirer[18] and Domenguez.[19] The former based his conclusions upon the injection of five hundred testes with merucury, and did not agree with Dolbeau as to the relative importance of the ampullary dilatations above referred to, so that future experimental work must be done before the question is decided.

That cysts may form where these serous layers come together seems most likely, and as they increase in size a communication with the seminal tubules is established.

Fourth. The effect of trauma was first advocated by Gosselin, and this theory is known by his name. He believed that a rupture of a semeniferous tubule occurred with extravasation of its contents, and cyst formation.

Curling,[20] in 1848, considered that the chief cause of these cysts was an accidental rupture of a seminal canal and the escape of its contents into a hydrocele sac, which we now recognize as a rare occurrence, as the chemistry of the fluid shows. As bearing upon this theory Tournade,[21] in a thesis published in 1903, related a series of interesting experiments concerning the modification in the testes consequent upon a breaking of the continuity of the vas deferens.

The experiments were carried on upon white rats of the same size and weight. The vas was resected between two ligatures in four, crushed with forceps in five, destroyed with the thermocautery in four and ligated in four. Their conclusions from these experiments were as follows: that breaking the continuity of the vas deferens in rats, whatever the method of procedure, may be followed by two different results.

First, when the canal is completely obliterated the stasis and collection of secretion, fluid and spermatozoa, behind the obliteration raises the pressure, causing a retrogressive change in the testis, which may be described as the disappearance of pre-existing spermatozoa, and stoppage of the formation of new until all the seminal tubules become absolutely sterile. Second; when the canal is not completely obliterated, the semen is emptied into the surrounding tissues and an extravasation cyst results, the testis remaining intact.

From these experiments it seems quite probable that similar extravasation cysts may result from blows or falls upon the testis. Dauve[26] relates a case where swelling followed an injury received while riding horseback. This was tapped six years after and found to be a spermatocele. Many other observers have noted a history of injury in these cases, and it may be safely regarded as one of the very probable causes.

It is also possible in tapping a hydrocele that the testis may be wounded, causing a seminal tubule to leak and thus cause the presence of spermatozoa in the hydrocele fluid. Maclean[25] reported a case of hydrocele of the left testis which was tapped, and which recurred and was again tapped five years later, and contained spermatic fluid. He considered that it was an entirely new cyst, but the possibility of a ruptured seminal tubule having leaked into the sac seems to me should be borne in mind.

Fifth. That unsatisfied sexual desire may be an important factor in the formation of these cysts has been maintained by

Sinitsin.[27] He contends that from this cause there results a compulsory strain and dilatation of the seminiferous tubules. That these cysts occur most frequently during the time of greatest sexual activity, from twenty-five to fifty years, he considers confirmatory, forgetting that most observers have placed the greater frequency beyond middle life when sexual desire is on the decline. The self-evident fact that while sexual excitement is practically universal, spermatic cysts are rare, he explains by assuming that when it does occur there must be some pre-existing cause, anatomical or otherwise, or that the patient must be very neurotic or weakened. As his original article is in Russian and my quotations are from the abstract of a translation, I may not do full justice to his views, but as stated above they are not convincing. As bearing upon this theory, we have a case related by Cavasse.[28]

A man of twenty-eight, who had gonorrhea, orchitis, and epididymitis on the right, leaving indurated masses in the epididymis, complained that after becoming sexually excited without gratification, he noticed pain in the right spermatic cord, soon followed by localized swelling of the testis. These symptoms would disappear spontaneously after ejaculation, rest, and an opiate wash. They would again reappear when he was hugging or kissing women, producing a high degree of sexual excitement without coitus.

This process repeated itself fifteen or eighteen times with intervals of ten or twenty days. Dauve,[26] in a case already cited, observed that the spermatic cyst present varied in size after coitus, and on one occasion it disappeared altogether after prolonged and repeated sexual intercourse. The character of this cyst was ascertained by tapping and microscopic examination.

These facts, while not conclusive, are nevertheless exceedingly interesting, and if later confirmed may place this theory in a more important relative position.

Sixth. Abnormalities in the blood or lymphatic vessels may be followed by cyst formation, but this form is very rare. From the study of these various theories it becomes evident that no one of them will explain the origin of all cases. It may quite clearly be seen that a spermatocele may originate in one ot two ways, first, by the formation of a simple serous cyst outside of the seminiferous tubules, with which it later establishes a communication, thus containing spermatozoa.

To this form belong the serous cysts, the cysts originating from the fetal relics and certain forms of retention cysts, especially those of ampullary origin.

The second form includes such cysts as result from injury to the seminal tubules themselves, and are formed by the seminal fluid itself with inflammatory secretions. In this class belong those of traumatic and inflammatory origin, and also the retention cysts produced by senile sclerotic changes.

Strictly speaking nearly all these various cysts are of the retention variety and our classification is purely an artificial one for convenience in describing them. We may safely assume that the explanation of the method of formation of most cases of spermatic cysts may be found in one or more of the first four causes already described and the relative importance is about in the order mentioned.

Situation: These cysts are usually found at the head of the epididymis and are extra-vaginal, although they may sometimes become intra-vaginal by the rupture of their contents into the sac of the tunica vaginalis, when they reach a large size. Such a result is not common, however.

Hochenegg,[18] in an examination of 332 dissection room subjects, found twenty-seven spermatoceles, seventeen of which were extra-vaginal. Most of the published cases show a much greater proportion of the extra-vaginal variety.

Very often they protrude into the cavity of the sac of the tunica vaginalis in the form of small sessile tumors with a long narrow pedicle, but they are still outside of it for they have pushed forward the visceral layer.

Number: They are more commonly single, but are frequently associated with simple serous cysts of small size, suggesting a similar origin in all.

Bacalogu[29] reports the autopsy findings of a case showing two cysts, one on top of the other, placed above and behind the testis between it and the epididymis.

Within the wall of the larger cyst were several small ones. Spermatozoa were found in the fluid from all. Several other similar cases have been reported, to which it is needless to refer in retail. A more interesting feature of these cases is their quite frequent association with hydrocele, both of the same and opposite sides. This seems to be a rather common complication, for many such cases are reported.

Anger[30] describes a case in a man of fifty-four in which two swellings perfectly distinct from each other were present in the right scrotum in addition to an easily reducible hernia of the same side. Puncture of the lower swelling was followed by the escape of a tumberful of characteristic hydrocele fluid. Without removal the trocar was introduced into the other swelling and a similar amount of equally characteristic spermatocele fluid was obtained.

Curling[31] reported the case of a man of thirty-one with a hydrocele of moderate size and two small cysts, both of which showed spermatozoa. Velpeau[32] describes a hydrocele and spermatocele existing together. Pinatelle and Duroux[33] operated upon a bilobular tumor of the right side of the scrotum, and found a small amount of hydrocele fluid in the tunica, and protruding into the cavity another thin-walled cyst attached to the head of the epididymis. The fluid from the latter contained spermatozoa, while that from the former did not. Coubronne[34] reports four similar cases, in one of which a rather unusual occurrence took place. This was in a man of fifty-four with a left scrotal swelling of the size of a testicle. A trocar was introduced and fifty grammes of milky fluid escaped, and then was followed without removing the trocar by twenty grammes of characteristic hydrocele fluid. Curious to find the explanation of this unusual phenomenon they operated and found that the trocar must have penetrated both layers of the tunica and entered the spermatic cyst, then slipped out a little and entered the hydrocele cavity.

Pepin[35] reports a case of spermatocele of the right and a hydrocele and spermatocele of the left side, and Marce[8] two cases in which a hydrocele and spermatocele existed on opposite sides. Stanley[36] found a similar condition in a boy of twenty.

Size: This may vary from that of a small pea to a child's head, but the majority are relatively small and contain only a few ounces of fluid. The small cysts the size of a millet seed so frequently met with are usually simple retention cysts, and do not contain spermatozoa.

Examples of cysts of large size are found in the literature of the subject. Fenn[37] reported one containing the enormous quantity of eighty-three ounces, Frost[38] one of fifty-two ounces, and Cameron[39] one of such large size that it dragged down the skin of the abdomen so that the orifice of the prepuce alone marked the situation of the penis. The testes could be felt and even seen, the right being at the bottom of the tumor, while the left was drawn up into the vaginal canal.

Stanley[36] reported an extraordinary case of double spermatocele in which the first tapping yielded forty-nine ounces from the left and fifty-eight from the right. Ten months later a second tapping gave twenty-eight on the right and fifty-five on the left. The walls of a spermatocele are usually cellulo-fibrinous in character with a pavement-cell epithelium and rarely may contain muscular tissue. The contents consist of a whitish fluid which has been variously compared to cocoanut milk, or barley water. This is not always true, for Liegeois[40] reported a case in which he found spermatozoa in a clear transparent non-albuminous fluid. This is a very rare condition and would suggest a retention cyst into which a few spermatozoa had entered from a ruptured semeniferous tubule.

With rare exceptions the fluid is of a milky character, often opalescent, and on standing settles gradually into two layers, the lower of which is white and contains many spermatozoa, while the upper is much clearer. Microscopically, this sediment shows great numbers of spermatozoa and a few lymphocytes and epithelial cells. After removal of the fluid the spermatozoa may retain their motility for several hours.

Baker,[41] Darenberg and Cazeneuve [42] have found them alive after twelve and twenty-four hours respectively. Chemically this fluid is characterized by a relative absence of albumen, which is in marked contrast to hydrocele fluid. There is a very small percentage of serum albumen and globulin is usually present. The reaction is alkaline from the presence of chloride of sodium, phosphate of sodium and the alkaline carbonates. As most analyses show about 98.5 per cent of water, the specific gravity is low.

The color, the relative absence of albumen, the low specific gravity as well as the presence of vast numbers of spermatozoa serve to quickly distinguish it from the ordinary hydrocele fluid, which is straw-colored, of high specific gravity, and contains a large percentage of albumen, but usually no spermatozoa. Occasionally we do find them present. As long ago as 1844 Dalrymple[43] noted their presence and considered it due to the wounding of a seminal tubule by the trocar or by the pressure made in the effort to expel the last few drops. I have myself found them present in hydrocele fluid and am inclined to believe they are more frequent than is supposed, and I am examining a series of cases to determine this point.

Bearing on this subject, Widal and Ravaut[44] published in 1902 an article on the "intracellular digestion of spermatozoa in a hydrocèle." They were able to demonstrate the phagocytic activity of certain cells, present in the fluid of a hydrocele, toward the invasion of spermatozoa. The case in question was an ordinary hydrocele whose fluid contained a few epithelial cells, which after careful examination were found to contain within their protoplasm small ovoid bodies taking the nuclear stain. Running out from these were long filamentous tails staining with eosin. They concluded that the macrophages were endothelial cells, while the oval bodies were spermatozoa which had escaped during the tapping ten days previous to the examination.

In the fluid from a chylocele we have also a milky fluid, but it is of a creamy white color, is more dense and not opalescent. On standing, this also separates gradually into two layers, the denser of which is usually at the top owing to the fat which it contains. The microscopical appearance is that of milk, many fat globules in a state of fine emulsion being present.

The symptoms of these spermatic cysts are usually objective wholly, being the presence of a tumor of varying size which grows very slowly, and when small is situated above and behind the testis. Rarely there are neuralgic pains. The age at which these cysts are most frequently found is in adult life between forty and sixty years.

I have examined ninety recorded cases, including my own, in reference to this point with the following results:

Under 20 years of age, 1 case.
Between 20 and 30, 11 cases.
Between 30 and 40, 11 cases.
Between 40 and 50, 17 cases.
Between 50 and 60, 25 cases.

Between 60 and 70, 16 cases.
Between 70 and 80, 8 cases.
Over 80, 1 case.

The diagnosis of these cysts before tapping is not easy. Those of small size must be differentiated from small inflammatory indurations of gonorrheal, tuberculous or syphilitic origin. Rarely the tension of the fluid within the sac is so great that we must consider the solid tumors of the testis, sarcoma, and carcinoma. Usually in those of large size the chief difficulty in diagnosis is in distinguishing them from hydrocele, hematocele, and chylocele. An important diagnostic point is the presence of the testis below and in front of the swelling, a point which should always be kept in mind when tapping. When hydrocele and spermatocele exist together on the same side the testis is between the two swellings.

By withdrawal of the fluid the diagnosis between these diseases is quickly made by the various physical properties already described. As I was so fortunate as to meet on the same day a case of hematocele, hydrocele and chylocele I have decided that the striking difference in color might well be preserved as an aid in diagnosis to the student or practitioner who does not often come in contact with them, and I have therefore had them reproduced in as near approach to the natural colors as was possible.

The first case, which was an hematocele, occurred in a man of forty-six, and was secondary to a syphilitic testis. The tumor was firm, hard, and cartilaginous from the great pressure within the cavity of the tunica, resembling far more a solid mass than fluid. Eleven ounces of bloody fluid were withdrawn.

The second case was an ordinary hydrocele in a man of seventy, presenting no unusual features and preserved only for comparison. The third case, a chylocele, was seen in consultation with Dr. Leon S. Medalia. The patient was a negro, a native of the West Indies, forty years old, who presented a tumor the size of a small orange on the left side of the scrotum. Three ounces of characteristic creamy fluid were withdrawn. Its origin was probably filarial. The fourth case was the first of my reported series.

As a rule these spermatic cysts do not present the pear-shaped outline of a hydrocele and their light transmission is less. When small they move readily with the testis.

The prognosis is good so far as life is concerned, as they are quite benign, but the integrity of the testis may be endangered from their presence.

The treatment is either by operation, the cyst is dissected out, which is quite easily done, and results in permanent cure, or by the tapping and injection of one to two drachms of tincture of iodine. I have been surprised in looking over the cases which have been reported to find so large a percentage of cure from this method, much greater than in hydrocele treated in the same manner. It would seem advisable to attempt this method of cure before proceeding to the more radical operation.

Becelaere[45] reports a case cured by injecting a drachm of normal liquid ergot. He claims for this method a milder inflammatory reaction. Not rarely simple tapping has apparently cured these cysts, as reported by several observers and as the fortunate result in two of my own cases shows. It is probable that the character of the wall of the cysts favors this result more than does that of a hydrocele.

From the literature of the subject which has been presented in this article it seems reasonable to conclude that spermatoceles are rare, that they are usually of considerable size as they present themselves clinically, that they contain a non-albuminous fluid with great numbers of spermatozoa, that their origin is not always the same, but in the main is that of retention cysts formed in various ways, either externally or internally, as regards the seminal tubules; that their diagnosis before tapping is not easy, but may be helped by ascertaining the position of the testis; and that finally, their treatment either by injection of irritating solutions or by operation is exceedingly simple and satisfactory.

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199-203.

TUBERCULOSIS OF THE URINARY TRACT.[1]

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THE urinary organs in the performance of their function, the elimination of systemic waste, are frequently exposed to tuberculosis, since the system tends to rid itself of infection by throwing off the germs with the urine. Accordingly it is natural where conditions exist favorable to the lodgement of a tubercular process that the urinary tract should often be the part involved. In this brief communication the clinical side of the subject only will be considered. In the majority of instances urinary tuberculosis begins insidiously and accompanied by few subjective symptoms until such time as, aided by some secondary agency, the infection becomes active and the symptoms then correspondingly severe. Traumatism and infection, singly or combined, are the secondary agencies which serve to cause activity in a tubercular process. Traumatism not infrequently results from instrumentation undertaken in connection with diagnostic explorations, while the gonococcus and the streptococcus, singly or combined, are the usual secondary infective agencies. From these statements the great importance of an early diagnosis of urinary tuberculosis is apparent, as well as the avoidance of the secondary agencies which serve to aggravate the disease. Oftentimes in its initial stage the positive diagnosis of urinary tuberculosis may not be possible or perhaps even be rendered probable without the aid of instruments through the use of which the exact existing conditions of the urinary tract may be revealed. There is no class of urinary cases, however, wherein the surgeon becomes so discredited in the mind of the patient as in connection with these tubercular instances, the patient while still comparatively comfortable, seeking the advice of a surgeon who, through instrumental traumatism undertaken for the purpose of diagnosis, inflames and renders acute a hitherto quiescent tuberculosis. Although no genito-urinary surgeon can avoid all such pitfalls, still one who is ever on his guard is comparatively rarely so caught. The prostatic sinus and vesical trigonum are favorite and probably the most frequent locations for a primary tubercular focus in connection with the urinary tract. The bladder mucosa about the ureteral orifices appears to be the part next in favor, while the renal pelves, the renal parenchyma, and the ureters are often affected. The urethra in the male is not nearly so frequently involved as in the female. When uncomplicated and in its incipiency the symptoms attending tuberculosis of the prostatic sinus and vesical trigonum are simply periodic urinary urgency and some frequency. The urine may be quite clear or charged only with a little excess of mucus and a few leucocytes. Corresponding early involvement of the kidney or pelvis is apt to be associated after the drinking of irritants, or after violent physical exertion with some pain in the loins, mild symptoms of renal colic and some urinary frequency. The first sign of the disease in the urethra is a slight watery or mucous discharge. If with such symptoms coming on insidiously and without a sufficient assignable cause, there be a tubercular family history, a history of poor hygienic surroundings, loss of weight and strength, or symptoms elsewhere, as in the chest, which might point to an antecedent focus of infection, then the surgeon ought to keep the possibility of urinary tuberculosis in his mind as he further investigates the case.

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[1] Read at the discussion on Tuberculosis of the Urinary Tract, New York Urol. Soc., Jan. 23, 1907.

Microscopical investigations undertaken in the hope of demonstrating the presence of the tubercle bacillus in these urines are apt to be disappointing and misleading, as the germ can only occasionally be found in the early cases. The demonstration of the disease through the inoculation of guinea pigs is more reliable, but still not very certain. The tuberculin test can be of decided value. If in a given case the surgeon from preliminary investigations has good grounds to strongly suspect that a tubercular process in its incipiency is the cause for the symptoms presented, experience has seemed to show the wisdow of one of two courses. First, either to suspend for the time being instrumental diagnostic investigations and put the patient on a general course of treatment anti-tubercular in character to see if the symptoms do not disappear, or second, before making instrumental investigations to tell the patient frankly that a tubercular infection may exist to account for the symptoms, and that such being the case a more or less severe reaction and aggravation of the symptoms may result from instrumental investigations undertaken the more surely to establish the diagnosis. If after this explanation the patient elects instrumental investigation and is thereby made uncomfortable, no just cause for blame can lie against the surgeon.

Granting the existence of a tubercular focus of infection the surgeon on attempting to make an instrumental investigation will almost invariably find that the patient appears to be very intolerant of the instrumentation, a manipulation which would ordinarily provoke but little discomfort, causing great pain and muscular spasmodic resistance. In making such urethral examinations cocaine is advisable, and for thorough cystoscopic study chloroform anaesthesia is to be recommended. This is for two reasons, first, to save the patient pain, and to avoid muscular spasm and tenesmus, and second, to enable the examination to be accomplished with a minimum degree of traumatism. Where the ureter is catheterized in connection with tuberculosis of the kidney or its pelvis, anaestheia is rarely necessary, owing to the tolerance of that organ to instrumentation. But in such cases careful attention to asepsis and the greatest gentleness in technique is most essential in order not to aggravate existing conditions. In the treatment of urinary tuberculosis the idea still seems very prevalent and widespread that the disease should be stamped out, as it were, like a bush fire, through the employment of vigorous local measures, or else that the knife should be used to pluck out, so to speak, the diseased area together with all the germs of infection, the patient being thus left free from every vestige of disease. Although never fully possessed of such utopian ideas, still in former years I must confess I have erred at times toward the application of these principles in certain cases. At present, however, I am firmly convinced that urinary tuberculosis is in general best treated as is pulmonary tuberculosis by pushing nutrition, by climatic regulation, by hygienic regime, and by therapeutic measures, exclusive of topical applications. In cases of vesical tuberculosis not long ago there was quite a controversy between those who favored supra-pubic cystotomy and curettage of the mucous surface, and those favoring perineal cystotomy with like treatment of the vesical wall, the perineal advocates finally getting somewhat the better of the argument, which was that as such vesical openings stood a good chance of never healing, a perineal fistula was really a very much more comfortable debility than a supra-pubic one. On giving this matter serious thought, however, most surgeons, and, I think, all patients informed on the subject, concluded that no fistula was really very much better than either of these two varieties, and so voted against either operation.

Tuberculosis in connection with the kidney calls for operative surgical attention more frequently than does a like infection elsewhere of the urinary tract. Still, even here tuberculosis should be treated conservatively. The other means already enumerated are best adapted to the majority of cases. Where, however, a patient is being debilitated by persisting pyrexia and constant or paroxysmal pain occasioned by renal suppuration or abscess, and especially in those cases where the suppurative process involves the perinephritic tissues, or where owing to ureteral obstruction free drainage is wanting, then radical surgery is called for, provided advanced tuberculosis elsewhere in the urinary tract or in connection with other organs does not exist to put the patient beyond the hope of relief from any agency.

Where radical renal surgery is advisable nephrectomy is the only operation to be recommended. Nephrotomy is usually simply of temporary benefit since that operation, by not removing the infected area, is very apt to secondarily aid the tubercular process by stirring it to further activity, the tissue disturbances and the traumatism consequent to the operation acting as factors in the dissemination and aggravation of the disease.

THE PATHOLOGY AND PATHOLOGICAL DIAGNOSIS OF TUBERCULOSIS OF THE URINARY TRACT.[1]

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THE present consensus of opinion seems to be that the primary lesion of urinary tuberculosis is most often in the kidney, that the prostate is less frequently the seat, that cases of primary bladder tuberculosis are relatively rare and that other primary lesions, while admittedly possible, are certainly of exceptional occurrence. The lesion begins by the formation of isolated tubercles which rapidly coalesce and finally degenerate with the formation of cavities and the discharge of purulent and cheesy material. These lesions are spoken of as primary only in the sense that they are the first seat of the disease in the urinary tract. Strictly, they are secondary though possibly to unappreciated foci, most likely in the lymphatic system, bones or lungs. Tubercle bacilli pass to the urinary tract generally through the blood stream and there establish the primary urinary focus. Direct infection from contiguous organs may occur, notably from the genital tract, though infection from the latter source may also occur through the blood and possibly the lymphatic streams.

Infection through the vesicle epithelium occurs, but bladder infection indirectly, through the blood and lymph, is more likely. The unilateral renal lesion tends to infect the other kidney through the blood. The time intervening is variable. Chronic inflammatory changes predispose to tubercular infection, whether induced by the injury of calculi or previous infections of other bacteria.

The diagnosis by the clinical pathologist of a tubercular lesion in the urinary tract consists of two steps.

First, the recognition of the lesion.

Second, the determination of its tubercular character by the recognition of the tubercle bacillus, as an etiological factor.

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[1] Read at the discussion on "Tuberculosis of the Urinary Tract," N. Y. Urological Society, January 23, 1907.

In many cases each of these steps is accomplished with reasonable facility and certainty. In occasional cases, one or the other, and possibly both present difficulties requiring the details of the more elaborate methods and the acumen of the trained observer to surmount. The existence of a chronic pyuria, with acid urine, with or without blood, with a weighable amount of albumen and a few casts is indicative of a lesion presumably renal, that suggests the possibility of a tubercular abscess. If the sediment of such a specimen contains acid-proof and alcohol-proof bacilli presenting the typical morphology of the tubercle bacillus the diagnosis of tuberculosis, probably renal, is usually satisfactorily established. The case with only a few leucocytes, an occasional blood corpuscle, a trace of albumen and, it may be, with only one or two acid-proof bacilli found, perhaps not really typical, this case presents pitfalls which only intelligent experience enables the pathologist to escape. It may or may not be tubercular. In determining whether it is, attention must be given both to the existence of a lesion which may be tubercular and to the nature of the accompanying bacilli which may be those of tuberculosis.

First, as to the question of the existence of a lesion. This must be definitely indicated, since it is quite possible for tubercle bacilli to appear in the urine without a tubercular urinary lesion, as in miliary tuberculosis affecting even remote organs of the body. The toxemia incident to the condition produces a renal hyperemia or slight glomerular degeneration and tubercle bacilli pass from the general circulation into the urine without the existence of a renal tubercular focus. The presence of albumen from the degenerative changes of the glomerular epithelium, of a few red blood corpuscles and leucocytes from the renal and pelvic congestion do not indicate a nidus of the tubercle bacillus, but are merely the products of a toxic action. The urine of these cases is usually concentrated. On the contrary, with an established tubercular lesion in the kidney there is usually polyuria with resulting dilution of the urine. Moreover, morbid products are more abundant in the cases which justify the diagnosis of a definite tubercular lesion.

As to the identification of the tubercle bacillus, we have to consider its staining properties, its morphology and its effect on susceptible animals. This bacterial organism is characterized as an acid-proof bacillus and is readily differentiated by this character from other bacilli which are not acid-proof.

As is well known, the smegma bacillus is likewise acid-proof and, moreover, frequently so closely resembles in its morphology the bacillus tuberculosis as to lead to confusion when the identification is based merely upon the morphology and acid-proof characters.

As to the morphology, competent observers differ as to whether the smegma bacillus does or does not present the beaded appearance sometimes seen in the case of the tubercle bacillus. Unfortunately, however, even if this be a point of difference a considerable number of the tubercle bacilli of the urinary tract do not present this feature. Again, the smegma bacillus is said to be less apt to appear in clumps and when it does is clumped in the irregular arrangement familiar in the typical typhoid agglutination, while in groups of tubercle bacilli, which are of relatively common occurrence in urinary tuberculosis, the rod-shaped organisms maintain a striking parallelism in their arrangement.

Bacteriologists do not agree as to this, however. Certainly, the morphology of individual non-beaded bacilli offers no means of identification. If any believe that they are able to differentiate these bacilli on morphology alone, let me warn them to the contrary, and if they present their experience as an argument, I can only say that they have been more fortunate than wise. However, we are not dependent on the morphology and acid-proof character alone. It happens that in most instances the tubercle bacillus is alcohol-proof, while the smegma bacillus is not. This difference is not absolutely qualitative, but is in a measure quantitative.

Many smegma bacilli decolorize in absolute or 95% alcohol in ten minutes, others require almost as many hours, a time sufficient to decolorize some tubercle bacilli. The stain of the smegma bacillus is particularly apt to resist alcohol if the preparation is sufficiently heated to nearly or quite brown the specimen at the edges; this error of technic is therefore to be avoided. We may conclude, then, that ready alcohol decolorization stamps the acid-proof bacillus as the smegma variety, while long alcohol resistance enables us to conclude that it is the bacillus of tuberculosis. In certain cases, where the decolorization is effected only after long treatment with alcohol, it is necessary to determine regarding the pathogenesis of the invader by animal inoculation.

Before considering this part of our subject, it may be well to refer to the method of staining. The number of different methods that have been suggested for the differential staining of the tubercle bacillus is so great that even their enumeration would be wearisome. In my hands, none of them presents any material advantage over the well-tried carbol-fuchsin method, followed by decolorization with mineral acids with, of course, subsequent treatment with alcohol, as has been described. It is some advantage, perhaps, to us an alcohol solution of the decorolizing acid, though this will not remove the need of further alcohol treatment. I have yet to learn that other staining methods yield more trustworthy results.

The matter of cultures may be dismissed with a word. The growth in culture of the tubercle bacillus, even under the most favorable conditions, is so slow that in the instances where other invaders may be present, as in secondary infections of the urinary tract, its isolation by this method is practically impossible. Where otherwise sterile material is to be examined and particularly bits of tissue obtained aseptically, the tubercle bacillus many times may be successfully isolated in culture; notably on dog serum or egg. With secondary invaders present, however, the growth of these is so rapid as to surely obscure the relatively slow-growing tubercle bacillus and render the method useless. As secondary infections pretty regularly accompany tuberculosis of the urinary tract, isolation by culture is not expedient.

The guinea-pig is most serviceable for inoculation. As the question of time is usually important, it is well to inoculate several pigs, say four. I prefer to inoculate two subcutaneously and two intraperitoneally. A pig is autopsied after six, eight, ten and twelve weeks, respectively, selecting the animal first that presents enlarged glands or, in the absence of this, shows emaciation. Suspicious enlarged glands are always subjected to histologic examination as are suspicious involvements of the peritoneum, omentum, liver, spleen or other organs. The method is satisfactory, excepting for the time and trouble required. Its use is indicated by unexplained pyuria and where the morphological examination for the bacillus is uncertain.

The necessity of distinguishing between the smegma and tubercle bacillus may be very largely obviated by removing the urine by catheterization. Where special precautions are not used, however, it is even possible to infect catheterized urine with the smegma bacillus. Ta avoid this, we have resource in the male to the special method of cleansing by washing the glans, and irrigation of the urethra with subsequent voiding the urine, as recently advocated by Young and Churchman, which in their hands, has in every one of a considerable number of cases removed the smegma bacillus as a confusing factor in the bacteriological diagnosis of urinary tuberculosis.

HEMATURIA DUE TO PATHOLOGICAL CONDITIONS OF THE BLADDER.

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GUYON has expressed himself to the effect that congestive conditions are mainly responsible for the alarming hemorrhages from the kidney and bladder. Such congestive conditions of the bladder only come to pass in the presence of marked anatomical or functional disturbances, as neoplasms, calculi, inflammations and retentions. In the kidney, however, it is possible for macroscopic as well as microscopic findings to be wanting in order to explain the congestion that produced the hematuria.

Again, Sir Henry Thompson says: "There are few occasions, I confess, which for me have excited a more lively interest than the moment at which my finger enters a bladder, the condition of which has been a theme of keen inquiry and speculation for some months or even for years before."

These two opinions at least afford us the encouragement that in our search for the cause of *vesical hemorrhage,* we shall encounter something tangible at all times.

We to-day, who are at home in the use of the cystoscope, hasten with this instrument to reveal in all certainty the nature of the vesical hemorrhage, therefore for us, an academic discussion as to the cause of a vesical hemorrhage has but a classic signifi-

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cance. Yet we should be mindful that the general practitioner who is first consulted, has to adhere to clinical methods strictly. How shall he put the questions? It will be convenient for him to distinguish between hematuria with and without pain; hematuria in its relation to infancy, youth and advanced years; and hematuria with regard to the act of urination.

Hematuria of the painless variety and void of any other symptoms is peculiar to new growths, all the more so if the hemorrhage is sudden, profuse and non-provocative. At first the hematuria occurs at long intervals and months and years may elapse before its repetition, but with the increase of the growth hemorrhages become more and more frequent, and pain is even added in proportion as the growth encroaches upon the trigone. Hematuria may be entirely disproportionate to the size of the growth, and traumatisms may bring on the hematuria in benign and malignant growths.

A digital examination of the base of the bladder by way of the rectum may at once disclose an infiltration suspicious of carcinoma and where this obtains, cystoscopy may be deemed superfluous. It is not possible to distinguish between a papilloma and a carcinoma save where the urine contains particles of the neoplasm whose microscopic examination clears up the situation. Furthermore, the urine of carcinoma has the appearance of a watery extract of meat, an offensive odor because of the proneness of the carcinoma to decompose, and, according to Ultzman, a condition of fibrinuria is said to be peculiar to carcinoma, also the appearance of hematoidin crystals. The hematuria of papillomata is of a bright red color.

Hematuria when associated with pain may be significant of any pathological condition of the bladder—it is therefore desirable to keep in mind the age of the patient. In infants we are most likely to encounter stone; in youth, inflammations of the bladder dependent on infections, chiefly gonorrhea and tuberculosis; in middle life, new growths added to the aforesaid; in old age, enlarged prostate and stone.

In infants examination by rectum and bimanual examination, often possible only by the use of ether, will disclose the presence of a stone. A co-existing gonorrhea or history of exposure will explain the severe cystic symptoms provoking a hematuria, and repeated search revealing the presence of tubercle bacilli in the urine will establish the diagnosis of vesical tuberculosis, rendered suspicious by the exquisitely painful urination by day as well as at night and the small capacity of the bladder. In old age the antecedent history of frequent urination, dysuria and retention, supplemented by palpation by way of the rectum, at once points to the enlarged prostate. Hematuria due to carcinoma of the prostate is present in a very small percentage of cases only when the disease has spread to the bladder wall. A very malignant growth causing hematuria only when the growth has attained a large size, is the sarcoma of the bladder wall, most frequently encountered in childhood.

There then remain the very rare conditions of hematuria peculiar to the inhabitants of Egypt dependent on distoma hematobium and filariasis of the tropics. The latter rarely provokes hemorrhage, and the same obtains for echinococcus cysts. All these parasites are to be recognized by the microscope. A condition of hematuria and strangury is found in aniline workers and precedes the eventual development of carcinoma. Solitary ulcers, non-tuberculous, cause very slight hematuria and are only to be diagnosticated by cystoscopy. Finally, following severe injuries, a specimen of bloody urine voided or obtained by catheter demands further investigation to ascertain if the rupture of the bladder be extra- or intra-peritoneal.

The character of the hematuria will shed light as to the diagnosis. Thus, hematuria of sudden appearance, its equally sudden cessation unprovoked by any violence or traumatism and its reappearance and each time of a bright red color, speaks for neoplasm. Hematuria of vesical tuberculosis and vesical calculi have much in common. The hemorrhage is terminal, bright red and associated with great pain at the end of micturition in both. The frequency of micturition, however, is incessant in vesical tuberculosis by day and night; in vesical calculi the frequency is not so great in the recumbent posture and the hematuria in vesical calculus more readily sets in after exercise. Microscopic examination may show particles of the calculus or tubercle bacilli.

The hematuria of enlarged prostate is capable of being most profuse and alarming. We distinguish between bleeding into a full bladder and hemorrhage into an empty bladder, the so-called hemorrhage exvacuo. The latter condition is purely artificial and caused by the too sudden withdrawal by catheter of urine following a retention. The vacuum thus created in the bladder favors a great inrush of blood into the diseased vessels with a rupture of the same. The former spontaneous bleeding is attributed to rupture of the (varicose) engorged veins which accompany prostatic enlargement. In pregnancy bleeding from varicose veins has too been encountered.

Where percussion of the suprapubic region shows a rapid increase in the area of dulness, bleeding may be suspected, dependent on engorged veins. The hematuria of distoma hematobium is intermittent and the ova will be found when the hemorrhage takes place.

It is terminal hematuria which of all the signs most strongly points to the bladder as the source of the disease. The same group of symptoms encountered in painless hematuria of vesical neoplasms is peculiar to renal neoplasms save for the occurrence of terminal hematuria in the former.

In thus viewing vesical hematuria from these three standpoints, of its relation to pain, age and urinary disturbance, we find a coincidence of symptoms which a searching cross-examination may unravel.

Thus far no mention has been made of the cystoscope. It may be deemed sophistry in the face of this ready method of making a diagnosis to elaborate on symptoms and their sequence, yet it is only by pursuing such a course that the cystoscopy will be resorted to like any operation, according to strict indications. While the hemorrhage is on in a vesical neoplasm it may not be possible to execute cystoscopy, for repeated washings to clear the bladder render it intolerable to hold sufficient water to perform cystoscopy. This should be performed in the intervals between hematuria.

The most certain remedy for hematuria due to papilloma is removal, suprapubic or endovesical according to Nitze. Where the hematuria is due to a stone we should elicit its presence in infants by bimanual examination and postpone cystoscopy as a preliminary to operation, to decide the question of lithotripsy or lithotomy.

In the profuse hematuria of suspected enlarged prostate cystoscopy is not possible and to no purpose. Here a very large indwelling catheter should be inserted and a free stream of very hot boric acid solution be allowed to circulate. This failing to arrest hemorrhage, superapubic cystotomy with turning out of the clots and tamponade of the bladder is indicated.

Hematuria only reaches quite troublesome dimensions in advanced vesical tuberculosis. The cystoscope is not possible of application here because of the intolerance of the bladder. It is far better to use the Kelly tube and make topical applications under narcosis. If one or two such applications do not arrest the bleeding it is better to open the bladder (suprapubic) and apply the curette or actual cautery to the lesion.

Where the symptoms of hematuria point to calculus it is far more advisable than employing a searcher to use a cystoscope. Its application may reveal concomitant lesions, ulcer or neoplasm, to account for the hemorrhage, and on the other hand we may be satisfied to use an evacuator for a small stone or crush a larger stone.

Constitutional conditions such as jaundice can cause very profuse hemorrhages from the bladder. To do a suprapubic operation under such circumstance is inadvisable for the bleeding of the wound continues. It is better to first attempt to use an indwelling catheter. Finally, hematuria due to a carcinoma that can be felt by rectum does not urgently call for cystoscopy.

Microscopic examination may reveal the presence of parasites and organisms or epithelial cells and tumor fragments, but the overwhelming consensus of opinion is that the source of the hemorrhage cannot be cleared up by its use.

In conclusion we note that there is nothing pathognomonic in the various hematurias due to pathological conditions of the bladder which distinguishes them from each other or differentiates them from renal hematurias that can be singled out by any other mode than the cystoscope whose limitations, however, have just been defined. There is, therefore, all the more justification to adhere to the academic distinction of painful and painless hematuria and the hematuria in relation to age and its bearing on urinary disturbances.

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THE PHYLETIC FACTOR IN VESICAL CARCINOMA.

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THE oldest of the three embryonic layers (epiblast) produces the epithelium of the skin, the central nervous system, and later the mouth and anus. The second layer (hypoblast) produces the epithelium of the alimentary canal and digestive glands. The last and intermediate layers (mesoblast) produces the connective tissue structures and the reproductive organs. The mesoblastic tissues complete their development after puberty.

The malignancy and frequency of cancer seem to vary directly with the phyletic age of the various organs, being least in the earliest, greatest in the latest organs. Thus carcinoma is notoriously frequent and malignant in the breast and the uterus. The breast, a specialized skin gland, appears with the mammals, the completely fused uterus with specialized cervix appears in the apes—both, therefore, among the latest organs. Cancer of the skin in general—that primeval organ—is notoriously benign compared with that of the breast; cancer of the fallopian tubes and the vagina (ancient parts of the Müllerian duct) is far less malignant and frequent than that of the uterus. Cancer of the rectum, stomach and large intestine is more frequent than in the older small intestines. Of the urinary organs the bladder is the latest, appearing first in the amphibians; and vesical cancer is more frequent and malignant than the same disease in the more ancient ureter and kidney.

The malignancy of bladder cancer may be compared with that of the breast; further experience has corroborated the doubt expressed by Guyon many years ago as to the benignancy of any form of epithelial bladder tumor. The surgery of vesical cancer, which is the creation of the cystoscope and therefore only twenty years old, has taught the same lesson learned through longer experience in the surgery of the breast. At first the surgeon removed cancer from the breast; then he removed the breast with the cancer; and in these latter days he removes the breast and all accessible lymph glands and fasciae liable to infection. And yet the permanent cures of cancer in this organ—ideally situated for surgical attack—do not average more than 33 per cent.

Still less favorable are the final results in the removal of vesical cancer, more difficult of access than is the breast. At first surgeons removed merely the cancer; then they resected the bladder with the cancer; latterly they have removed the entire bladder —and yet permanent cures are less than 25 per cent.

Within the year hundreds of operations for vesical cancer have been reported and reviewed by Keydel, Watson and Trephin. Keydel[1] reports fifty-seven cases of extirpation of the cancer; of the 38 survivors whose history was traced nearly all died within six months. Partial resection of the bladder was made in 96 cases with 21 operative deaths; of 52 survivors who were traced, 24 died of recurrence within the first year and only five were free for more than three years. Total extirpation of the bladder was made in 30 cases with 17 operative deaths; only two of the survivors were alive at the last report.

Watson[2] collects 410 cases, with 46 per cent. of deaths and early recurrence; even the tumors considered benign recurred rapidly in 20 per cent. of the cases. Trephin[3] reviews the history of 45 patients whom Kümmell has operated for tumor in the past 20 years, including 34 papillomata and nine carcinomata. Of the former 19 were malignant and rapidly recurred. In three of the 12 apparently benign growths, rapid recurrence ensued. Only five of thirty patients with malignant tumors survived seven years after operation; cancer recurred even eight or more years after removal.

Such results prompted Bazy to declare to the French Urological Congress that no material improvement in results has been shown in the past twenty years; even total extirpation of the bladder, while increasing the operative mortality, does not seem to afford much immunity against recurrence.

While excision of malignant vesical tumors seems justified by the mitigation of the patient's sufferings, yet permanent cure can be expected in only a small minority of the cases; recurrence is frequent years after the operation. It behooves an operator therefore to be extremely conservative and deliberate in reporting the operative cure of vesical carcinoma or even papilloma. The potential malignancy of apparently benign papillomata, which has been abundantly shown in clinical experience, seems to be inherent in the bladder epithelium. The most obvious explanation is that which ascribes the malignancy of carcinoma in breast, uterus, rectum, large intestine and prostate, as well as bladder, to the genetic activity of recently specialized tissues which I have called " the phyletic factor in carcinoma."

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[1] Centralblatt f. Krankh. der Harn und Sexual Organe, 1906, No. 6.

[2] Annals of Surgery, December, 1905.

[3] Deutsch med. Wochenschrift, 1906, No. 19.

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HEMATURIA IN NEPHRITIS

HEMATURIA is not infrequently encountered during an infectious disease or intoxication and the renal hemorrhage of smallpox, scarlet-fever, measles, malaria, and so forth, is well known. These hematurias are produced by bacteria acting either directly, or indirectly by their toxins, on the kidney, and later on by the lesions of sclerosis which may be engendered by the action of the poisons on the renal tissue.

In descending or hematogenic nephritis the renal gland gives evidence, in the very acute forms, of violent congestion, occasionally with ecchymoses, hemorrhages and slightly evident epithelia lesions. In the acute forms one may meet the same lesions as in the very acute form, but with a hemorrhagic predominance, while in the prolonged types the elimination of the bacteria and their toxins finally ends in sclerotic lesions resulting from the reaction of the connective tissue, which in their turn cause the kidney to bleed.

Independently of the congestion of the inflamed organ and the cellular necrosis, one should take into consideration the lowerd specific gravity of the blood, which may be so marked that it alone may give rise to profuse hemorrhage. Robinson lays great stress on the importance of the hemorrhagic action of certain poisons, certain toxins and dyscrasias, such, for example, as rickets, which decalsifies the blood and, rendering it less coagulable, favors the production of hemorrhage.

The hematuria of acute intoxications, due to cantharides, essence of mustard, sublimate, arsenic, and so forth have about the same pathogenesis and animal experiments have shown that the hypodermic injection of cantharides causes a tumefaction of the kidneys, desquamation of the epithelium of the tubuli contorti in the first place, afterwards of the straight tubuli, and finally a leucocytic infiltration in the interstitial tissue. Intense congestive phenomena arise in the renal pelvis which may even produce hemorrhage.

In ascending nephritis lesions of sclerosis irregularly disseminated in the parenchyma, or even lesions of suppuration, may be produced and under these circumstances there is great congestion of the kidney, the organ being riddled with abscesses and ecchymosis while phenomena of necrosis may even be present.

Slight, or even severe and persisting hematuria may be encountered in Bright's disease and this loss of blood is due to congestive attacks which, aided by disturbances of the innervation, changes in the blood and vascular lesions, favor hemorrhagic raptus. Pousson believes that generalized arterial hypertension and cardiac hypertrophy, so frequent in the small contracted kidney, favor rupture of the vessels.

Besides Bright's disease there is another category of chronic nephritis which plays a very important part in the pathogenesis of hematuria. These nephritides manifest themselves clinically only by hematuria and occasionally by albuminuria and pain. The parenchymatous or interstitial lesions of sclerosis met with in these cases, as in Bright's disease, present certain peculiarities for they are, in the first place and for a certain time, unilateral, afterwards becoming disseminated in the midst of healthy tissue to a more or less great extent. It may be supposed that these lesions, although frequently microscopic, form what may be termed *partial nephritis,* a form which may give rise to formidable hemorrhage, cases of which have been published under the rubric of "essential hematuria." The nature of the lesions found readily lead one to understand the mechanism of the hemorrhage, which, as in Bright's disease, is dependent upon disturbances of the innervation, blood changes and vascular lesions. The circulation, which may still be carried out effectively under ordinary circumstances in this vascular system so markedly changed, becomes hindered upon the slightest disturbance, from which arises attacks of congestion ending all the more easily in a hemorrhagic raptus the more fragile the vessel walls have become by arterial sclerosis.

These lesions only appear in certain glomerular groups and consequently can only be brought about by some chronic intoxication, such as alcohol, an infectious disease or even simple renal congestion. For this reason the sclerotic lesions will be found associated with other causes of the hematuria, such, for example, as calculus, malignant disease, tuberculosis, movable kidney, cysts, and so forth, and to these causes in themselves capable of causing the kidney to bleed, the hemorrhagic action of the sclerosis becomes added.

We are led to believe that certain hematurias entirely due to congestion, usually of short duration and easily controlled by medical treatment, may become both tenacious and abundant, from the formation of lesions of sclerotic nephritis. It is not necessary that the lesions of sclerosis be very considerable in order to give rise to hematuria, because small lesions apparently of only slight importance may give rise to formidable hemorrhage and of sufficient gravity to place the patient's life in danger.

PROFUSE HEMATURIA AND COLICKY PAIN IN NEPHRITIS.

MODERATE hemorrhage in nephritis is by no means uncommon; but severe hemorrhage is relatively infrequent, and is characterized by the great excess of blood which appears in the urine, causing it to resemble blood itself. In many of these cases the bleeding is accompanied by colic. A number of cases are recorded by Askanazy, some being verified by post mortem investigation, others terminating in recovery. These hemorrhages usually commence suddenly, and occasionally cease abruptly; more frequently, the cessation is gradual, in the course of several days. The hemorrhage begins without pain, which may be absent throughout. When pain occurs it is not always of the same kind; it is either of the nature of colic, such as occurs in nephrolithiasis, accompanied by rigors, vomiting and elevation of temperature, or it may be less violent and more continuous, and sometimes is less a real pain than a painful or disagreeable sensation. The pain is most intense in the region of the kidneys on one or both sides; sometimes it alternates from one side to the other, and it may radiate to the bladder, genitals and down the legs. The kidney region, however, may be free from pain which may manifest itself in the lower part of the abdomen, the bladder and lower urinary passages. Most commonly the pain is of the colicky type. The urine is not lessened, and may be increased. The duration of the hemorrhage varies from one or more days to weeks or months. The results of palpation are mostly negative, apart from some tenderness on pressure. The bleeding is generally one-sided, the left or right indifferently; only one or two double-sided cases are recorded. Men are much more liable to be attacked than women, and most frequently at middle life, between thirty and fifty years of age. The general symptoms of acute nephritis are absent, or nearly so; except for the presence of blood the urine shows none of the usual nephritic changes. Few casts, if any, are present, and dropsy is rare. Uremic symptoms are wanting.

Many of these cases have been operated on, either on account of suspicion of calculus, tubercle or tumor, or else purely for diagnostic purposes. Simple incision of the kidney has proved efficacious in some cases, in others, decapsulation has been tried with a certain amount of benefit, but experience of this operation in the condition under discussion is as yet very limited.

Askanazy thinks that the blood in these cases of profuse hematuria probably comes from the mucous membrane of the renal pelves, one ground for the opinion being the exceptional occurrence of blood-casts in the urine. In many of these cases ecchymoses have been found in the mucous membrane of the renal pelves, either post mortem or in the course of surgical operations. Pelvic ecchymoses are also far from uncommon in ordinary nephritis; they probably appear in about one-fourth of those attacked. He regards the ecchymoses due to three possible causes—venous stasis, inflammation, or arterial congestion. He dismisses venous stasis, as in many cases in which ecchymoses were present no cyanosis had occurred, and of six cases in which most pronounced cyanosis was observed in only one were hemorrhages present in the pelvic mucosa. Inflammation of the mucosa is not sufficient to account for the ecchymoses; moreover, it probably occurs only in consequence of certain abnormal states of the urine, as in gouty subjects, when it contains great excess of uric acid, or in some other way is rendered poisonous or becomes infected. There remains arterial congestion which, along with two other factors—increased blood-pressure and abnormally pervious vascular walls, both common in nephritis—the author believes will account for the ecchymoses and also for the attacks of profuse hematuria. The accompanying colicky pains are, in some instances, caused by blood clots passing down the ureter; but, inasmuch as in other instances the colic has occurred at a time when no hematuria was present, it is obvious that other casual factors must exist. Therefore, one may accept Israel's explanation, and refer the colic, as well as the hematuria, to paroxysmal congestion of the arteries of the pelvic mucosa. In cases where the presence of a blood-clot in the ureter is the cause of the colic the urine may suddenly cease to be blood-stained for a time, and then as the pain abruptly ceases the hematuria recommences, with possibly some blood-clot in the portion of urine first passed. The colorless urine constitutes the secretion of the unaffected kidney, the secretion of the diseased kidney being arrested by the clot blocking the ureter. Coincident with the escape of the clot cessation of the pain and renewal of the hematuria occur.

EDITORIAL

THE INDICATIONS FOR OPERATION IN CYSTITIS.

BEFORE considering the question of surgical interference in cases of cystitis, one should, in the first place, be assured that the bladder is really involved and that the case is not one of a pseudo-cystitis due to some affection of the kidney, or to an inflammatory process in the neighborhood of the bladder. Certain symptoms of cystitis, such as painful micturition and purulent urine occur in certain renal affections, as for example, tuberculosis of the kidney or an infected nephrolithiasis; at other times an extra vesical inflammation is present. The latter condition of affairs should be suspected in cases where a sudden and inexplicable change takes place in the symptoms presented by the patient, while at the same time a very marked pyuria makes its appearance. A detailed examination of the kidneys and urine, cystoscopy and intra-vesical separation of the urine allows one to settle the question and recognize the cause.

A marked sensitiveness of the vesical mucosa, made evident by catheterization, or vaginal or rectal examination, pleads in favor of an affection of the bladder and against some renal disease. On the other hand, a cloudy polyuria, an increase in the size of the kidney accompanied with pain on pressure, concomitant digestive disturbances and a rise in temperature points to a participation of the kidney.

Now if the treatment, which in the first place should be medical, consisting of instillations of silver nitrate at 2%, vesical irrigations, etc., proves ineffectual, the permanent catheter should be resorted to. The latter does not always prevent pain, nor spasmodic contraction of the bladder as soon as a few drops of urine enter its cavity, so that, under these circumstances, it is indicated to put the organs at rest by suprapubic cystomy. The fistula should only be kept patent temporarily and after recovery from the inflammatory process it should be allowed to close. If the changes in the mucosa show no tendency to cicatrization in spite of a carefully conducted local treatment, it is indicated to interfere again after having performed a careful cystoscopic examination. The curette, or cautery, should be resorted to for the removal of lesions or when defects exist in the substance of the vesical mucosa.

There is another type of cystitis which may require surgical interference; we refer to pseudo-membranous cystitis, which gives rise to pain and homorrhage, while the membranes can only be partially detached by medical treatment.

Suprapubic cystotomy should only be resorted to after a complete failure from milder measures, such as irrigations, instillations, the permanent catheter and internal medication, but when the bladder process is due to some medullary disease, all surgical interference may be considered, generally speaking, as contraindicated. Supposing even that the operation might give rise to some relief, the latter will be merely temporary and the recurrence of the former symptoms will not be long in taking place.

The advantages of suprapubic cystotomy are demonstrated by an immediate amelioration of both the local and functional signs; the urine becomes limpid, while the pain and spasm disappear, and the use of the cautery and curette will in many cases produce a definite cure.

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THE TREATMENT OF INFECTIOUS PYELONEPHRITIDES.

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DURING my year as interne in the service of Dr. Bazy, it was my good fortune to have under my care a number of cases of infectious pyelonephritis. I followed the lessons and the precepts of my eminent master, who searches systematically the involvement of the upper urinary tract in all patients presenting infection, either of the bladder, urethra, or genital organs. By employing the method advocated by him for some time past, and upon which he has recently again insisted (*Presse médicale,* Dec., 1902), I have been able to remark the frequency of lesions of the ureter; in the male these occur in cystitis, urethral stricture and hypertrophy of the prostate, while in the female they arise in infections involving at the same time the bladder, uterus and adnexa. Clinical examination of the ureter has also given much information in pyelonephritis with retention, in those instances of very large pyonephrosis, which are in the domain of surgery, and which, according to many modern authorities, find their origin in the circulation and are not consecutive to lesions of the lower urinary organs.

Now, at the present time, the fact is a classical one, namely that " the excretory canal and glandular parenchyma are generally involved simultaneously; frequently even changes occurring in the ureter alone provoke, keep up, or aggravate the renal changes." (Tuffier, " Traité de Chirurgie," 2d edition.)

Clinically, it is a difficult matter to fix the limits of the ureteral lesion and to decide whether or not instances of isolated ureteritis exist. In certain cases we have been able to distinctly establish the participation of the kidney by resorting to separation of the urine and the elimination test of methylen blue. The condition of the ureter consequently gives many useful indications relative to the condition of the kidney, and if patients are observed daily from this standpoint, not only the evolution of the ureteritis can be followed, but that of the pyelonephritis as well.

Now, if an appropriate treatment is adopted opportunely to ureteritis and pyelitis, the lesions will be seen to regress and finally a cure is obtained. In the first part of this paper I wish to bring out the fact that acute and subacute simple pyelonephritis can be cured by medical treatment. Some of our cases showed a marked amelioration in their condition, but left off treatment because they found it too long. Beside these cases I will also refer to a certain number of undeniable cures and in this group we were unable to find any remaining pathologic condition of the ureter, nor urinary disturbances.

The classical books insist little on the symptomatology of simple pyelonephritis and its early diagnosis; almost all articles published on the subject consider the affection when it is fully developed. It is consequently of the highest importance to systematically search for pyelitis in all subjects possessors of a persistent infection of the lower urinary tract, and consequently I would, in the first place, say a few words on the means of diagnosis as taught by Bazy and afterwards will indicate the principal points in the evolution of the disease.

Placed under a severe treatment at the very beginning of the affection, the majority of cases of simple pyelonephritis become arrested. In point of fact, it is a kind of preventive therapeutics; the point to be obtained is to do away with the infection, prevent retention and the development of the chronic stage, and here one is dealing with the medical period of pyelonephritis.

Beside this class of simple pyelonephritis, which remains in the domain of medicine, is to be found a second class with septic retention. Whether they be of an ascending origin and following those affections of which we have just spoken, or whether they arise from the circulation—and such is the conception of modern authorities,—pyonephrosis demands surgical therapeutics. For this reason the latter part of this memoir will be given up to the study of operative indications, these being derived from the condition of operative indications, these being derived from the condition of the kidneys. I shall also consider the exploratory and laboratory methods which allow one to appreciate the functional value of each gland. And lastly, the study of the treatment of pyelonephritis of pregnancy will be considered, a condition presenting a particular evolution in relation to the physiological and pathological states which give rise to it. Tuberculous pyelonephritis will be left completely aside as it differs totally from the infectious forms.

The diagnosis of simple pyelitis and pyelonephritis. In some cases pyelitis commences with marked symptoms. The patient complains of chills, abdominal pain, while the temperature rises rapidly and the pulse becomes rapid. When the pain is seated on the right, it may be mistaken for appendicitis. A case in point has been published by Roland in the *Tribune Médicale.* The patient was admitted to Beaujon Hospital as an emergency case presenting abdominal rigidity on the right, a painful spot seated in the right iliac fossa and a peritoneal expression. The diagnosis was made the next day, the painful area merely representing the paraumbilical point which I shall consider further on, while the urine was purulent. At the Lariboisière Hospital, I met with a similar instance, the diagnosis faltering between typhoid fever and appendicitis, when in reality the case proved to be an acute pyelitis.

More frequently, however, it is during the progress of chronic infections of the lower urinary tract, such as prostatic hypertrophy, urethral stricture, incomplete vesical retention, or stubborn cystitis that pyelonephritis becomes silently installed; the commencement is subacute. Under these circumstances women will present lesions of the tubes and leucorrhea due to the metritis. They complain of frequent micturition, while the urine is cloudy. Usually to the uterine and tubal lesions the diagnosis of subacute cystitis is made. Now, as the cases which I have observed show, in the greater number of women the infection has already extended beyond the upper tract and has reached the structures of urinary excretion. Consequently, pyelitis usually develops without distinctive symptoms and requires to be looked for, and it is only by a careful examination of the physical signs and an analytical study of the functional symptoms that these cases of infection can be detected and properly cared for.

From the functional standpoint nocturnal pollakiuria should be carefully considered. The pollakiuria is sometimes absolute, micturition being more frequent during the night than during the day; sometimes it is only relative, in which case it is either quite as much, or somewhat less frequent than during the day. It is naturally of importance to exclude the noctural pollakiuria of interstitial nephritis, prostatic hypertrophy and chronic residual cystitis, which is accompanied by other special symptoms. Nocturnal pollakiuria is a most valuable sign and will be found in almost all the cases here reported.

This symptom, however, is only of value when associated with pyuria. The quantity of pus is most variable. There are all the intermediaries between enormous deposits at the bottom of the jar, which are pathognomonic, and cloudy urine, which by centrifugation shows leucocytes and epithelial cells. Microscopical examination of the deposit in the tube after centrifugation is, in point of fact, the only precise method for revealing the presence of pus in the urine.

Clinical examination will permit one to corroborate these presumptive signs and affirm the lesions as well as determining the affected side. Exploration of the ureter should be complete from the bladder to its entrance into the renal pelvis. In its abdominal portion the pain produced by pressure at several points is symptomatic, but the painful spot most frequently encountered is the paraumbilical area. It will be found on a horizontal line passing through the umbilicus 3 cm. from the median line. The pain is produced by pressure with the pulp of the fingers, although it should be gentle and progressively reaching down to the deep structures. Subcostal pain is less constant and corresponds to the upper end of the ureter at its juxtarenal portion.

And lastly, it is of necessity to search for the kidney and the pain produced behind in the costal muscular angle.

Pressure over these three points frequently reveals a particular sensitiveness and sets up a desire to urinate and this is the pyelovesical reflex upon which Bazy has insisted so much.

Exploration of the pelvic ureter is much easier in the female. It is sometimes possible to palpate a normal ureter by way of the vagina. When this canal is inflamed it gives rise to the sensation of a large and painful cord. The examination, however, must be methodically carried out. After having located the cervix with the finger the latter is carried a little bit forward in the median line. If there is cystitis the fundus of the bladder is painful. The finger is carried a little more outwardly and higher and during this the finger should be displaced from above downwards, descending, so to speak, up to the lateral cul-de-sac. When the seat of the lesions, the ureter is enlarged and painful, giving the sensation of a hard cord, while occasionally one may feel indurated foci surrounding it, due to periureteritis. If exploration of the cord is carried out forwards, it will finally be lost from the sense of touch, but frequently a sharper pain will be set up, which may be termed inferior ureteral pain to which much importance is given by Bazy, because it corresponds to the vesical orifice of the tube. By this sign one may affirm the presence of ureteritis by rectal examination in the male, because in point of fact it is impossible to feel the ureter above the prostate.

But it is possible by introducing the finger up to the level of the prostatic cornua to explore the vesical orifice of the ureter. The pain produced at this point may be sufficient to decide upon the diseased side.

We should also add that in order to distinctly feel the ureter in the female one should use the left index finger for palpation of the left ureter, and the right for the right.

However, these symptoms do not always complete the diagnosis. The association of absolute or relative nocturnal pollakiuria with pyuria and the physical signs of ureteritis make it certain that pyelorenal infection exists.

In going over the numerous cases collected in Bazy's service for the last few years, it at once becomes evident that a goodly number of cases of pyelitis pass on to the chronic stage when left untreated. This affection, however, does not prevent patients from attending to their work, it takes on a subacute form, and the patients only complain of a frequency in micturition. The subjects are especially females who appear at the hospital at irregular intervals and do not allow themselves to be placed under appropriate treatment. They retain their pollakiuria, purulent urine, and upon the occasion of some excess or intercurrent malady they start up the infectious process and come for advice, so that it is quite permissible to question if some instances of pyelonephritis of pregnancy have not been preceded by this subacute phase which escapes the notice of physicians. This subacute evolution and tendency to chronicity brings out the importance of an early and well-directed treatment.

The pyelitis arising in prostatics and those having urethral stricture also tend to become chronic. All that is necessary is that retention supervenes and the patient will immediately have a rise in temperature. In one of our cases the patient had had a chronic pyelitis with acute attacks for a period of ten years. The primary infection was gonorrheal. At the end of ten years pyelonephritis with retention developed and he was operated on for a pyonephrosis.

In prostatics who have retention and vesical infection a rise in temperature will immediately follow the removal of the permanent catheter. The kidney becomes large, the ureter painful and a pyelitis is thus provoked which immediately ceases as soon as natural drainage is re-established. Consequently, simple pyelonephritis may terminate in suppurative processes in the kidney, requiring surgical interference.

If, however, the pyelitis has been discovered after a careful examination, if behind the mask of the ordinary symptomatology of cystitis, one has taken the care to examine the condition of the ureter, it may be hoped that by a severe treatment the various serious evolutions of the affection may be prevented. The cases that I have seen establish the proof of numerous cures obtained in these cases.

Under the influence of medical treatment the virulence of the infection may be controlled, resulting in a cure of the lesions in the upper urinary tract.

Treatment of simple pyelonephritis. The principal part in the cure of this affection is played by diet and hygiene. To these two principal factors must be added the treatment of the lesions existing in the lower urinary tract, their glands and the genital organs, lesions which keep up the infection; and lastly certain medications which, renewed of late, are of great value.

Hygiene in cases of pyelitis consists principally in rest in a horizontal position. A bed or a couch are almost indispensable for bringing about a cure. Under the influence of repose the lumbar and abdominal pain become quieted and the frequency of micturition diminishes. By keeping charts showing the frequency of micturition during the day and night, we have seen a progessive diminution, along with a cessation of the rise in temperature, while the urine has cleared up. It is above all the mild cases where the size of the kidney is not increased and the ureteritis alone is apparent, that the morbid phenomena rapidly improve under the influence of rest; three weeks or a month are sufficient to bring about a cessation of the principal symptoms.

When the lesions are more accentuated, or when they are bi-lateral, when the kidney is enlarged and painful, with a positive methylen blue test, several months' rest is necessary. In one case we were able to witness the commencement of an acute pyelonephritis and follow it for over three months until a cure was obtained. The patient entered the hospital for a tubal pregnancy, which had ruptured. At the end of a few days attention was called to her kidney on account of lumbar pain. The organ was enlarged and painful, the urine purulent. The elimination of the methylen blue and endovesical separation of the urine confirmed the diagnosis. The urinary symptoms slowly and progressively improved. The patient was operated on for the hematocele after the pyelitis had been cured, the pyuria, lumbar pain and pollakiuria had disappeared. Since leaving the hospital she has been seen and has had no return of her urinary disturbances.

Rest should consequently be kept up as long as the pyuria, pain and frequent micturition persist, and to rest the usual means of stimulating the cutaneous functions are to be added, such as frictions with a stimulating liniment, while the patient should avoid all exposure to cold.

The food should consist of milk only for some time, and in order that the stomach may tolerate this diet it should be given in fractional doses. A half a litre should be given at nine o'clock in the morning and after this every three hours until ten o'clock in the evening. In patients who tolerate milk well the amount may be increased, but those who become rapidly tired of it may be given some weak tea, or the milk may be replaced by soups made of the various cereals and milk, eggs and aromatic creams.

As soon as the urine becomes clear, white meat and fish with purées of vegetables and cooked fruit may be allowed. Dark meat, game, spices and alcohol should be prohibited for a considerable length of time even after cure. Strong mineral waters should also be prohibited and as an ordinary drink Evian or Saint Galmier waters may be given.

As long as the pyuria is present diuretic infusions should be administered. Certain balsamic infusions should be particularly insisted upon, as they give excellent results in suppuration of the urinary tract, especially infusion of uva ursi and buchu.

The infection of the ureter is frequently kept up by an infected urethra or bladder, and in these cases a badly treated gonorrheal urethritis or a chronic cystitis are frequently found. In cases of chronic urethritis the ordinary treatments, such as instillation of nitrate of silver or irrigations of potassium permanganate are to be resorted to. In case of stricture the lesions should be removed by gradual dilatation or internal urethrotomy. For stubborn cystitis vesical irrigation and instillations are first to be tried and if they fail injections of iodoform vaseline, continuous irrigation with a double current catheter, or cystotomy will be required. In prostatics the use of the permanent catheter will be found the best means for preventing ascending infection.

In the female cystitis is frequent, but it can usually be cured by instillations of nitrate of silver, or protargol. Besides this the vagina and uterus must be carefully disinfected and any lesion of the tubes treated; leucorrhea is a continual source of infection for the lower urinary tract.

To sum up we may say that the principal aim in treatment should be to diminish the infection of the urethra and bladder and favor drainage of the infected upper tract by doing away with all causes of retention, such as urethral stricture or hypertrophied prostate, the drainage being accomplished by the natural passages or artificially.

The medical treatment of pyelitis has been greatly enriched during the past few years with certain active products which render great service. Let me recall the preparations advised by Prof. Albert Robin, the first of which is balsamic medication. Among the balsams preference should be given to benzoic acid and sodium benzoate. Both these drugs not only act on the general nutrition, but they delay ammoniacal fermentation of the urine and lessen the formation of uric acid crystals. Consequently they are the drugs of choice in cases of calculous pyelitis. The benzoate of soda should be given at the dose of from 1 to 4 grams in 24 hours, and may be continued for a very long time without any inconvenience. To the benzoate of soda it is always well to add the ordinary balsams, such as benzine, turpentine, balsam of tolu, copavia, etc. The following is a good way of administering it; sweeten each cup of infusion of uva ursi with a soup-spoonful of the following:

Syr. tolutan	300.00
Sodii benzoat	14.00

Prof. Robin advises the use of Harlem oil after the first period of the affection is over, 50 drops being given in 200 grams of syrup of gum with which the infusion should be sweetened as in the above.

I will not insist on revulsion or astringent medication which comprises iodotanic syrup, cachou, etc., for at the present time they have been given up. For that matter, for some few years past the balsams have been somewhat neglected in favor of the use of internal antiseptics. Salol at the dose of from 3 to 4 grams in 24 hours is frequently given in Bazy's service and seems to give excellent results, but when given over an extended time, it produces renal irritation, so that it should only be prescribed for a few days at a time, keeping a strict watch over the patient.

During the last six years a new drug has been introduced into the therapeutics of urinary affections, its action being very marked and gives excellent results. I refer to urotropin, which was first advocated and experimented with by Nicolaier. It may be taken at the dose of from 1½ to 2 grams a day. According to Nicolaier, 10 grams are necessary to produce albuminuria in the dog, and 15 grams are necessary to produce hematuria. Urotropin becomes rapidly eliminated and within fifteen minutes it can be detected in the urine in which it gives rise to the escape of formalin vapor. It is by just this action that this drug acts as a urinary antiseptic of the highest quality as it destroys bacteria and prevents ammoniuria; but this antiseptic action only takes place at the body temperature, the escape of the vapor not occurring at the ordinary temperature. Under the influence of this drug the pus disappears rapidly from the urine, likewise the pollakiuria and so forth. Urotropin is only slightly toxic, but nevertheless there are certain patients who tolerate it badly and if they take it for a considerable time digestive disturbances may arise or painful micturition. Consequently, I believe that it should not be administered for any great length of time without some interruption. Urotropin acts so rapidly that at the end of a fortnight if pyuria still persists it is useless to continue its administration and this very fact shows that one is dealing with deep-seated chronic lesions upon which an antiseptic has no action.

More recently a product succedaneous to urotropin has been tried, namely, helmithol, which, from the chemical point of view is an anhydronethylencitrate of henamethylentetranum. According to the papers which have been published on helmithol in Germany, it would appear that this drug is perhaps more of an antiseptic than urotropin, because 85 centigrams appear to have an activity quite equal to two grams of urotropin. It also appears that it does not give rise to gastric disturbances, nor painful micturition.

According to Professor Robin strong alkaline waters are absolutely contra-indicated, especially in cases of calculous pyelitis, because they favor alkalescence of the urine and the formation of phosphatic calculi.

An hydrologic cure practically means drainage; consequently light waters which are easy of digestion and absorption should be chosen, the prototype of which is Evian. The water may be taken either at the source or at home. It should be taken between meals at ten o'clock in the morning, at four in the afternoon and at ten o'clock in the evening. In cases of pyelitis, Vittel is to be recommended, likewise Contrexeville, while, in cases of old pyelitis, waters containing iron, such as Forges, Spa and so forth are to be recommended.

The treatment of pyelonephritis with distension. Instances of pyelonephritis with distension, which have been cured by medical treatment, have been recorded (Guyon, Roberts), but such cases are exceptional and, as Tuffier has said in the Traité de Chirurgie, edited by Duplay and Reclus: "As soon as the kidney is distended internal medication is no longer applicable, and, if minute care, in certain social conditions, may bring about a marked amelioration, quite equivalent to a cure, one should not for this reason wish to treat these cases medically. From this standpoint the general condition of the patient is an excellent criterion as soon as it becomes weakened; as soon as the temperature rises and remains above the normal, one should boldly interfere, all the more so because the results of the intervention are frequently marvelous." Consequently, hesitation is no longer permitted in septic renal retentions, because they should be compared to abscess of the liver and so forth; the pus is to be evacuated when the ureter no longer fulfills its office of a natural drain.

Certain cases, however, must be distinguished. There are circumstances where an interference imposes itself immediately and becomes one of imperative surgery. Such was the case of a patient, who, after having submitted to two nephrostomies, one on the right and the other on the left kidney in Prof. Terrier's service, was seized with a new attack of anuria necessitating a third nephrostomy.

Imperative was the interference undertaken in another case in which the pyonephrosis had been accompanied for three days with phenomena of intestinal paresis with abdominal distension, a pulse of 100, temperature 40°C., and retention of gas and feces.

These cases of imperative nephrostomy in purulent renal retentions are infrequent and in most cases the patient may be studied for a few days relative to the operative indications.

I have pointed out when speaking of the evolution of simple pyelonephritis that a certain number of instances might go on to the chronic state and be accompanied for quite a length of time with an almost normal condition of health. The same applies in some cases of pyonephrosis, where the ureter drains the kidney sufficiently. Numerous are the instances of stricture and prostatic hypertrophy in which pus is voided by the urine for years. It is evident that the general condition is not satisfactory, that frequently elevation of the temperature is noted, that there are intermittent discharges of pus, that the patient becomes emaciated and worn out by the incessant formation of pus, but these purulent pyelonephritides are quite compatible with life. All that is necessary is to thoroughly drain the bladder with a permanent catheter, or dilate the urethra and so forth, in order to evacuate the pus which continually forms.

But as soon as the lumen of the ureter becomes obliterated, as soon as pus forms behind this obstruction with dilatation of the renal pelvis or the gland itself, in a word as soon as there is retention, new symptoms make their appearance which require the interference of the surgeon. The condition is made evident by general and local signs. The former are those belonging to all great suppurative processes, namely an irregular fever with marked oscillations, occasionally taking on the physiognomy of intermittent fever with chills and sweats and accompanied with changes in the general health, such as considerable emaciation and leaden color of the integuments; then we have varied digestive disturbances, such as vomiting, distaste for food, constipation and abdominal distension, the result of intestinal paresis.

When these patients are examined a resistance can be felt in the lumbar region, and if the examination is carried out still further a large tumor projecting especially forwards will be made out. It is generally difficult to mark out its contours by abdominal palpation, because in front of it will be found a sonorous line due to the interposition of the gut. If a hand is placed in the costo-iliac space and the tumor is displaced, ballottement can be elicited. Occasionally fluctuation may be detected. Palpation is painful, and frequently there is rigidity of the abdominal walls. Such is a rapid sketch of the picture of septic renal retention. In the great majority of cases the question of operating comes up, and in order to decide it is well to follow the advice indicated by Guyon, basing oneself on the evolution of the tumor and the general phenomena. In point of fact, it is very frequent to see these patients tend towards an amelioration. The pyuria is frequently intermittent, while there are periods of pus retention with abundant evacuations, a condition of affairs readily detected when the daily urine is collected. It is consequently necessary as recommended by Hartmann, to follow these patients for a certain lapse of time before operating.

An operation will be necessary when the phenomena of retention remain constant. It is during this period of observation when there is a question of the advisability of surgical interference, that the functional value of each kidney and the condition of the ureters can be studied. In point of fact it appears to me that it is absolutely necessary for both these questions to be settled before choosing a serious surgical interference on the kidney.

The study of the respective functional value of both kidneys is an indispensable preparatory condition of every surgical interference on these organs. This study, in the first place, went through a clinical phase and it was by direct exploration of both kidneys that the functional value of each gland was in the first place estimated.

But the condition of the renal tumor is quite insufficient to throw light upon the condition of affairs, but much useful knowledge may be gained by the symptoms furnished by examination of the ureter which I have already referred to. In fact, the presence of a large and painful ureter, the uretero-vesical and pyelo-vesical reflexes will give clinically, without any complex method or resource to the laboratory and without any relatively dangerous interference, all necessary knowledge as to the bi-lateral or unilateral seat of the lesions. According to my way of thinking these signs are of the highest importance.

For several years past the laboratory has been of great use clinically and new methods of scientific exploring have been devised and I will briefly review them because they are of great interest from the standpoint of operative interference in pyonephrosis.

Research of the value of the total renal function. Before obtaining the urine from each kidney by modern methods, it is quite necessary to know the total functional value of both kidneys. This value will be made evident by chemical analysis, microscopical examination of the sediment, cryoscopy of the blood and urine, provoked elimination and glycosuria.

The analysis should be made of the twenty-four hour urine and all information will be furnished by the urea, chlorides, phosphates and potassium. In order to be of any value one should take into consideration any intercurrent affection which may modify the elimination, and above all the diet. Consequently, it is well to keep the patient on a milk diet, fractional feedings being given every two hours. The feeding being the same, several analyses should be made at a two days' interval. The mean result of the analyses should be employed in order to make up a table of the total urinary elimination which can then be compared with the analysis of the urine taken from each kidney.

The examination of unorganized sediment is much less important than the examination of figured elements and this should always be undertaken while the urine is still fresh. Deformed, granular and refringment leucocytes will be found in large numbers accompanied with round or polygonal epithelial cells and so forth, which are of little import.

According to Browne of Baltimore, the pyuria of cystitis is accompanied with very little albumin, while a pyelitis, on the contrary, gives rise to a very marked albuminuria.

Another sign has been described by Bouchard. A few drops of Fehling's solution are dropped into a test-tube filled with purulent urine; the tube is then shaken and a few air bubbles are produced in the liquid which remain imprisoned in the bulk of urine. It is then heated; if the pus is of renal origin the coagulation which has imprisoned the bubbles will be seen to rise to the surface. Both these signs referred to are far from possessing an absolute value.

A study of the sediment may occasionally show the presence of casts. Renal suppuration is accompanied with the elimination of numerous waxy and epithelial casts, indicating inflammation of the calices and renal pelvis.

Numerous are the substances which are administered to patients in order to seize upon the disturbances in urinary elimination. These are, on the one hand, drugs which give a characteristic reaction to the urine, such as antipyrin, salicyclic acid, resorcin, carbolic acid, thullin, etc. Of all these various tests made in pyelonephritis, two have remained and merit our attention; these are the methylen blue and phlorydzin tests.

The blue test has been applied by Achard and Castaigne in the study of renal permeability. In consists in injecting a cubic centimetre of sterilized pure methylen blue into the buttocks. The urine is collected every half-hour after the injection until the blue appears in it; as soon as the blue tint is perfectly distinct, the urine is then only collected every two hours. It is easy to graduate the elimination by placing the same quantity of liquid in each test tube. The elimination occurs after the first hour in a cyclical fashion for thirty-six to forty-eight hours. The apparition of the blue is often preceded by that of chromogen, which is revealed by heat and acetic acid. The blue test was undertaken in a number of our cases and it showed distinctly that in certain cases of ureteritis and simple pyelitis without a renal tumor there was a distinct participation of the kidney.

This test was systematically tried in the cases of nephrostomy and nephrectomy. Usually elimination was delayed; sometimes the blue was not eliminated in substance, as in the case of nephrectomy followed by death and where autopsy showed a large white kidney on the opposite side. The duration and intensity of the elimination of the blue by the opposite gland will be all the greater the more the permeability of a diseased kidney is diminished. Bazy attaches a great importance to the intermittence in the elimination of the drug.

It was also with the intention of examining the functional value of both kidneys that induced glycosuria has been resorted to, a method employed by Achard and Delamarre. Five milligrams of a sterilized solution of phlorydzin is given subcutaneously and the urine is then collected as in the former test. Glycosuria will appear within thirty to sixty minutes; it then keeps up until it attains from 50 centigrams to 2½ grams and then disappears from two to four hours after having attained this maximum. The results obtained by these two methods in the same patients have given different results, a fact which in no way injures the tests, simply proving that each substance has a coefficient of elimination particular to each given subject. The elimination method has already given proof of what it can do and should not be rejected, because " the parallelism between the elimination of the blue and the urinary excretion exists in general, but not exactly equal, it being especially noted in marked disturbances of the renal function " (Albarran and Bernard).

It is also interesting to employ in cases of pyelonephritis a method which has had a certain reputation in the study of medical nephritis; I refer to the point of coagulation of the urine. Cryoscopy shows the molecular concentration and osmotic tension of liquids. It is consequently necessary to establish the relationship between the point of congelation of the blood and that of the urine. If the quantity of urine is taken into consideration, and this is a very important matter, this relationship will indicate the renal permeability. This method, consequently, is another very excellent one for the research of the total functional value of both kidneys.

Research of the functional value of each kidney. I have now described the means employed at the present time which allow one to study the ensemble of urinary elimination, so that we may now pass on to the comparative study of the value of each kidney. For some years two procedures of separate removal of the urine from each kidney have struggled for superiority, namely catheterization of the ureters and intravesical separation of the urine.

Catheterization of the ureters was introduced in surgical practice by Gremer and afterwards by Casper and Albarran. The employment of this measure is greatly discussed in cases of pyelonephritis and has given rise to a great number of objections. There are certain conditions which are absolutely indispensable in order to resort to it. The necessary condition has been put in evidence by Gosset, who, at the instigation of Rosving, divides the pyonephroses into pyonephrosis with and without cystitis. Catheterization of the ureters can only be employed in the latter, because the intolerance of an inflamed bladder renders all cystoscopic and ureteral examination impossible.

Other objections have been made, namely, that the operation is difficult, delicate, and one necessitating special instrumentation, and great skill in cystoscopy.

There are not alone painful and intolerant bladders, whose capacity is reduced to the minimum, but there is also occasionally an impossibility to make a serious examination on account of the presence of pus, calculi, hematuria, ureteral obstruction, spasms and folds of the ureter and so forth.

And lastly, the enemies of catheterization of the ureters have upheld that the method is dangerous, considering that all vesical or ureteral interference in patients already infected might be the means of causing an acute outburst. However that may be, this method has given excellent results and is a means, when it is possible to resort to it, which will give an idea as to the condition of the ureter and the state of the opposite kidney, as well as the functional value of the organ.

It is far from my intention to judge the value of this procedure, nor the objections which have been made, but I will say that the method appears most scientific, although it should be pointed out that there is one cause of error in that the presence of the catheter in the ureter may give rise to a reflex action which may disturb the secretory equilibrium of the gland and thus give rise to false results in the analysis of the urine obtained.

The urine from each kidney has been obtained by a much simpler method and which appears to have been accepted by those who decry catheterization of the ureter.

Certain objections are to be made to this method, however, because separation is sometimes impossible, as was found in one case where it was impossible to obtain any results, because the catheter was continually plugged up by purulent matter in spite of a careful irrigation of the bladder before the instrument was introduced.

In other cases the bladder is intolerant and there always exists the danger of a traumatism of the urinary organs already infected. Nevertheless, I believe that separation of the urine will be frequently used in place of ureteral catheterization and will benefit by the contra-indications of the latter.

Quite recently, Tuffier and Mauté demonstrated that this method is capable of rendering the greatest service if one knows how to interpret the results. These authorities have exactly defined in what really scientific conditions one should place oneself in order to study the separated urine. It is necessary to put the patient on a fractional milk diet and it is also necessary for separation to be made during half an hour and that the minimum quantity of urine must amount to 10 cubic centimetres.

When these conditions are fulfilled the cryoscopic point of the urine from each kidney should be established and then multiply this point Δ, which indicates the number of eliminated molecules in the unity of volume, by the volume itself. Thus one obtains the number of molecules eliminated by each kidney. If authorities, basing their opinions on the catheterization of the ureters, are not in accord as to the comparative functioning of each kidney during the same time, it would seem well established that the urine separated in the bladder in subjects presenting no renal lesions, gives identical results. If, consequently, one obtains a different product for each kidney, the ratio $\frac{A\Delta \text{ right}}{A\Delta \text{ le}}$ will express the value of the functional condition of the kidney from that of its sister. One may also estimate the urea, chlorides and phosphates on each side.

Certain causes of error may, however, occur in this research. It is necessary to note the residue which may remain in the bladder and cause a variation in Δ, and one should take into consideration a polycystic kidney.

However, in quite a number of cases of pyelonephritis, the results are quite distinct; purulent urine will be found on one side, while clear, or almost clear urine will be obtained from the other. One should resort to the microscopical study of the organized and non-organized sediment, resorting to the procedure that I have already indicated for the research of the total functional value of both kidneys. One may also combine with this examination the elimination method and induced glycosuria. Separation performed on one of our patients half an hour after the injection of methylen blue, showed that there was half an hour delay in elimination on the diseased side.

Immediate nephrostomy. At the present time it seems useless to enter into a long discussion as to the comparative value of the two operations resorted to in septic renal retention, namely nephrectomy and nephrostomy. The question seems definitely settled and all surgeons seem to agree that the precept formulated by Guyon is correct, namely, that a kidney is to be preserved as much as possible. Primary extirpation of the kidney is no longer a method of choice in pyonephrosis, it should be absolutely exceptional and will only be indicated in extremely rare circumstances. It has against it a high mortality proven by the statistics of Bergmann which show 43.9% and those of Otis showing 38%. a mortality due to two kinds of causes, namely, operative shock and above all the lesions of the opposite kidney. Primary extirpation of the kidney in pyelonephritis is at the present time almost completely abandoned.

Nephrostomy, on the contrary, presents evident advantages and it offers in renal retention the same conditions that artificial anus offers in cases of intestinal obstruction. From the standpoint of the intestine every one is in accord that, in the first place, one should endeavor to re-establish the normal course of the feces in order to avoid intoxication and infection of the organism by allowing an evacuation of the intestinal contents. Later on, when the case calms down, one may then interfere in order to remove the cause of the obstruction, or to re-establish the proper course of the feces by plastic operation. Early nephrostomy in pyonephrosis gives marvelous results; it causes the temperature to fall and diminishes the purulent condition of the urine. The only objection that can be raised to this operation is the fact of the frequency of persistent fistulae following it, and in point of fact they are rather the rule than otherwise. They are burdensome for the patient, but they are quite compatible with an active life, and on the other hand they may occasionally close spontaneously. In those instances where they persist, they may be made to heal by operative measures.

The technique of the operation need not be described and I will merely call attention to the principal points insisted upon by Guyon and Alberran. "The kidney should be freely exposed by a large incision, and the various purulent pockets should be broken down so that they freely communicate with each other and the renal pelvis, these always existing in large numbers in renal retention and, in order to facilitate future operations, the borders of the pyelorenal pocket should be sutured to the edges of the incision."

The question now arises as to whether to nephrostomy one should add operations destined to avoid purulent retention, or whether, on the contrary, the latter should be reserved for a second seance? These operations have been performed at one sitting by Fenger, Israel, Richardson and Albarran. All these operations, however, are delicate, and in plastic operations the sutures do not hold, surrounded as they are, by septic tissues.

Primary nephrostomy should consequently alone be done and allows the surgeon to do away with the immediate alarming conditions; by lumbar drainage the septicemia disappears, the general condition undergoes an amelioration, the temperature drops to normal, the appetite re-appears and frequently one observes a true resurrection. It is only after a ureteral rest of a certain duration that one may attempt to restore the physiological rôle of the ureter and cause the persistent fistula to disappear. During this time, the renal pocket has retracted and from this very fact there is a diminution of the tension, so that the gland may have regained a portion of its secretory value.

(To be Continued)

ON VOLUMINOUS RENAL CALCULI; WITH A REPORT OF TWO CASES.

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RENAL calculi have been the object of study for a number of years and cases recorded in literature are very numerous; it appeared to me, however, that there was still some opportunity of considering the question of renal lithiasis from the standpoint of the characters and symptomatology of large stones and the means by which a diagnosis can be made. Observers have been struck by the slight amount of reaction set up in the organism by these enormous masses, which occasionally may be absolutely wanting in symptoms. The majority of large calculi, especially before the advent of renal surgery, remain completely latent and were simply autopsy findings, and without considering the history of the question I shall immediately enter into the subject matter of this paper.

The shape of large renal calculi is very variable. Usually they are rounded, but they may take on the most peculiar forms, and Civiale, who has described a certain number of them, found that they varied anywhere from coral shape to that of a molar tooth. In the following case the calculus was composed of three independent masses joined together by articular facettes. The patient, 48 years of age, complained of pain in the right lumbar region with cloudy urine containing pus. Nothing in the hereditary antecedents; personal antecedents only revealed a mild typhoid fever at the age of 19.

Twenty years ago the patient contracted gonorrhea, and by the use of injections the discharge diminished; a few days afterwards, after a bath in the ocean, he thought that he voided blood with the urine. For two or three days, although he had no severe pain, the urine remained brick-colored. Then, suddenly, he was seized with a violent pain in the right lumbar region. The pain was paroxysmal and radiated towards the abdomen and right inguinal region. The attacks of pain were accompanied by vomiting and diarrhea, their duration being about ten hours. Then all pain disappeared, but the patient noticed from time to time that the urine was red, although the pain did not recur.

The condition of affairs remained pretty much the same for ten years; consequently it was about ten years later, that the patient again had violent attacks of pain in the lumbar region and at the same time the urine became purulent and fetid. This was in 1896. Urine analysis at this time showed total 24 hours amount 2 litres, cloudy and fetid; ammoniaco-magnesia phosphates, epithelial cells and albumin. The patient then followed out a treatment and was improved by it; he returned to his work, but the urine remained cloudy.

Eighteen months before coming under observation, while the patient was leaning over, he experienced a violent pain in the left lumbar region when he assumed the erect position. The pain persisted for several days on the left side and then passed over to the right, where it became intermittent with exacerbations. Each time that the patient bent over, or tried to lift a load, at the time that the lumbar mass of muscles contracted in order to bring the trunk into the erect position, he experienced a violent pain which kept him doubled up and it was only little by little that he was able to assume the normal position, the pain having disappeared. Upon several occasions this phenomenon occurred. Occasionally the pain appeared without any appreciable cause, while the patient was walking, upon which occasion he was obliged to stop on account of its severity until it had completely disappeared. At this time he was obliged to keep his bed for three months and this rest considerably ameliorated his condition, but the urine still contained a large quantity of pus.

From this time on there was no more hematuria which formerly occurred two or three times a year. The patient, however, has never remarked any relationship between the hematuria and fatigue or jolting.

Thirteen months ago he consulted Dr. Luis, who made a separation of the urine and noted that the right kidney secreted three times more than the left.

However, no other examinations were made as the patient ran a temperature of 40°c. shortly after this examination and he would not allow another one on account of the pain.

He then consulted Dr. Albarran, who sounded the bladder, but found no stricture.

Present condition. The patient was kept quiet in bed for a month, and this time he also experienced a considerable amelioration. No rise in temperature could be detected. He ate, drank and slept well. When standing he complains of dragging in the right lumbar region, this sensation radiating toward the abdomen. The maximum point of spontaneous pain was found immediately above the iliac crest in the prolongation of the sacro-iliac joint.

The patient was unable to lie on the left side for the reason that he experienced a cramplike pain on the right side of the abdomen, which lasted for an instant and then gave an immediate sensation of relief.

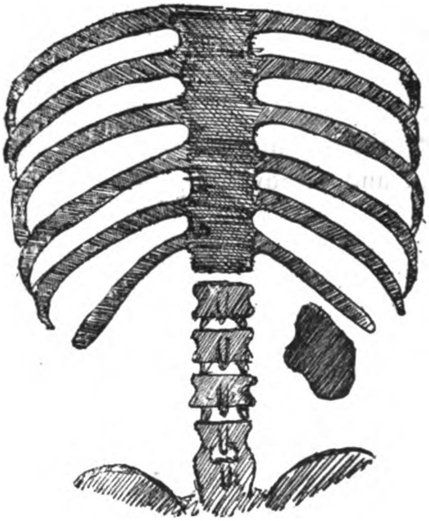

Fig. 1.
Radiograph of Case I.

By palpation the iliac fossa was lax and sonorous. More deeply, a painful point can be elicited somewhat inward to MacBurney's point.

The ureter could not be felt. Bimanual palpation of the right kidney in the first place, gave rise to a localized pain in the angle formed by the twelfth rib and the mass of spinal muscles. The kidney is found painful and somewhat increased in size. Palpation of the left kidney revealed nothing. Examination of the heart and lungs negative.

Radiography done by Dr. Vaillant distinctly showed quite an opaque shadow occupying the right lumbar region and corresponding to the painful point revealed by palpation; the shadow is irregular and leaves some doubt as to its interpretation. (See Fig. 1.)

Urine examination showed that there was renal lithiasis with pyonephritis upon the right.

Operation by Prof. Poirier on December 27th. Patient placed on the left with the right thigh flexed and a cushion placed under the left flank in order to make the opposite side project. Incision carried from the twelfth rib obliquely downwards and forwards. The fat capsule was then incised and the right kidney exposed, the organ being difficult to seize. It was large and exploration showed in its upper pole and towards the hilum a large stony tumor.

The kidney being fixed, its convexity was incised, but only in its upper pole. Bleeding was quite profuse and digital exploration gave exit to much urine and pus, which was immediately sponged away. Several calculi were found and removed by forceps; in size they were about that of a walnut. After this a very large calculus was detected and, although wedged into the kidney mass, was somewhat movable. With clamps it was seized and slowly brought up between the borders of the incision. It was about the size of a small hen's egg, its lower surface being smooth. Another large calculus was felt, even bigger than the first and which was immovable and deeply seated. It was soon brought up and projections were found over its surface which corresponded to the renal calices.

As soon as the large calculi were removed the hemorrhage, which up to this time was quite severe, commenced to diminish. A few other small calculi were removed, making a total of twelve, three of which articulated between themselves by two articular surfaces which were extremely distinct. The total weight of the calculi was 120 grs.

Ligature of two rather good sized arteries in the renal parenchyma was then done and two drainage tubes inserted in the wound, one going into the kidney and the second into the fatty capsule.

The operative results were good; the second day the dressings were soaked with blood-tinted urine; dressings changed.

The drains were successively removed, the last at the end of fifteen days, and at the end of four weeks the wound was completely closed and the patient well. The urine was still somewhat cloudy from time to time, usually that voided during the day. However, it was usually voided clear and only became cloudy by standing.

Examination of the calculi showed that they were of the ammoniaco-magnesium phosphate type.

In point of fact the external shape is determined by that of the organs in which they develop, namely the calices or pelvis; the branch or coral-formed varieties are due to the juxtaposition of several calculi.

Their weight may be considerable, as the following figures show; in Reynier's case they weighed 650 grms., in Shield's case 594 grms., 1,015 grms, in Le Dentu's case, the large calculus preserved in St. Bartholomew's Hospital weighs 1,030 grms, while one removed by Van der Pohl weighed 2,575 grms.

Like other renal calculi, they may be composed of uric acid, oxalate or phosphate of calcium, while those made up of xanthin or cystin are the exception. However, large calculi are in the majority of cases composed either of pure uric acid or of a uric acid nucleus covered by a layer of phosphate of calcium. The oxalate calculi hardly ever are larger than a nut, while those composed of pure phosphate of lime are rare.

The calculus removed in the case just related enters into this category, because it was entirely composed of ammoniaco-magnesium phosphate.

The situation of large renal calculi varies from one case to another, at least primarily. Some develop in the renal parenchyma, others in the calyx or pelvis. At a certain time in their evolution they generally occupy a sort of cavity, more or less irregular, formed by the pelvis or the calices, which have undergone a change in their shape, the renal parenchyma being pushed towards the periphery.

The lesions produced by the presence of calculi in the kidney are very slight in certain cases, while the integrity of the renal parenchyma remains, macroscopically at least. The development of the calculus, no matter how large it may be, takes place in the pelvis, and in no way interferes with the renal function. However, Albarran affirms that this integrity is only apparent and that every case of lithiasis, even primary, corresponds to a diathetic nephritis, due to the originating cause, namely the lithiasis. This nephritis, which in the beginning is epithelial, ends sooner or later in an interstitial nephritis, produced only partially by the calculus, whose action simply aggravates the lesions produced by the elimination of salts.

In other cases visible lesions exist, although slight, in the pelvis and calices, which are thickened. At a more advanced stage a combined action of the disathesic nephritis and of the calculus produces an atrophy of the kidney which is more or less complete, the organ becomes transformed into a pocket formed by its proper membrane which is thickened by sclerosis and perinephritis.

To the lesions belonging to the kidney itself, others become added, that of the fatty tissue enveloping the organ being particularly noted by observers. The sclerous perinephritis, especially lipomatous, is constant and its occasional excessive development contrasts markedly with the atrophy of the kidney. This lesion is for that matter common to all inflammatory processes of the kidney and contributes, as I shall show later on, to increase the difficulties of diagnosis.

Lastly, in rare cases according to Legueu, frequent according to Albarran, a calculous hydronephrosis exists. This lesion is infrequent in cases of large calculi, which have no tendency to obstruct the ureter and thus interfere with its function. There may, on the other hand, be a coexistence of a calculus in the ureter with that of one in the kidney as the following case illustrates:

The patient, a male, aged 51 years, entered the hospital on April 4, 1903; his mother died of old age; his father from Laennec's cirrhosis. He has one sister who is well.

The patient has always been well, although he had attacks of colic up to the age of twenty-three years, after which time these phenomena disappeared.

He drinks considerably, from two to three litres of wine daily, with aperatives, so that he has already been in the hospital six years ago for Brights disease. He was also treated eight years ago for nephritic colic. Since this time the patient has experienced no symptom, his appetite has been good and he commenced to drink as in the past.

Four months ago, November 30th, the patient was taken with colic and pain in the kidneys and a physician diagnosed a lumbago and applied dry cups. Since this time the patient suffers from colic which has increased in intensity; the paroxysms are continous, dull, and last the greater part of the day and the night. They are relieved by poultices, at least for a little while. Occasionally he experiences localized pain in the lumbar region.

Since the commencement of these symptoms the patient has noticed no change in his stools, and he has never noted any melena. The movements are daily and normal, likewise micturition. He has never had hematuria. Never any vomiting nor any marked disturbances of the digestive tract, but he has lost much flesh during the last four months, about twelve pounds he thinks. He only eats soups and hardly drinks any wine and partakes principally of milk.

Present condition. General condition appears relatively good; the patient is thin, his expression somewhat drawn, while the cheeks show evidences of varicose veins, indicating an atrophic cirrhosis, other symptoms of which were found. He still complains of pain which he localizes in the lower part of the hypogastrium on each side of the median line. The abdomen is not distended, but a small hernia is found on the right and a complete femoral hernia on the left.

By palpation the abdomen is found painless on the right, but on the left quite a severe pain can be elicited in the flank and lower down to the side of the median line.

Palpation of the right side showed nothing abnormal and examination of the liver made it evident that this organ hardly extended more than one finger's breadth below the costal border and was thus slightly atrophied.

The left side is occupied by a mass which extends to the median line and downwards to the extent of one finger's breadth below the umbilicus, dipping over into the left flank. Palpation of this mass is slightly painful and shows that it is composed of two parts: an internal mass which is very hard, smooth, and rounded, being about three fingers' breath in width and separated by a distinct sulcus from the external mass. The latter is soft in consistency, almost renitent, while dullness is continuous from the costal border to the tenth rib.

Bimanual palpation of this mass gave evidence of renal ballottement and quite distinct fluctuation; palpation was painful.

The urine was uniformly cloudy, two litres being passed within 24 hours with an abundant deposit. It contained no glucose, but presented 1.25 grm. of albumin. The abundant deposit gave all the reactions of pus. Microscopically leucocytes and red blood cells were present in quite a marked quantity. Prof. Poirier was rather inclined towards the diagnosis of a splenic tumor of a tuberculous or hydatid nature.

In order to enlighten the diagnosis radiography was resorted to and revealed a large renal calculus in the left kidney and in the ureter at a point corresponding to the sacro-iliac symphysis was another calculus. In the right kidney was found a calculus which had not been suspected, because the organ was painless when palpated. On the left, pain existed on account of infection. The calculus appeared to be of the coral type and extended upwards under the twelfth rib. (See Fig. 2.)

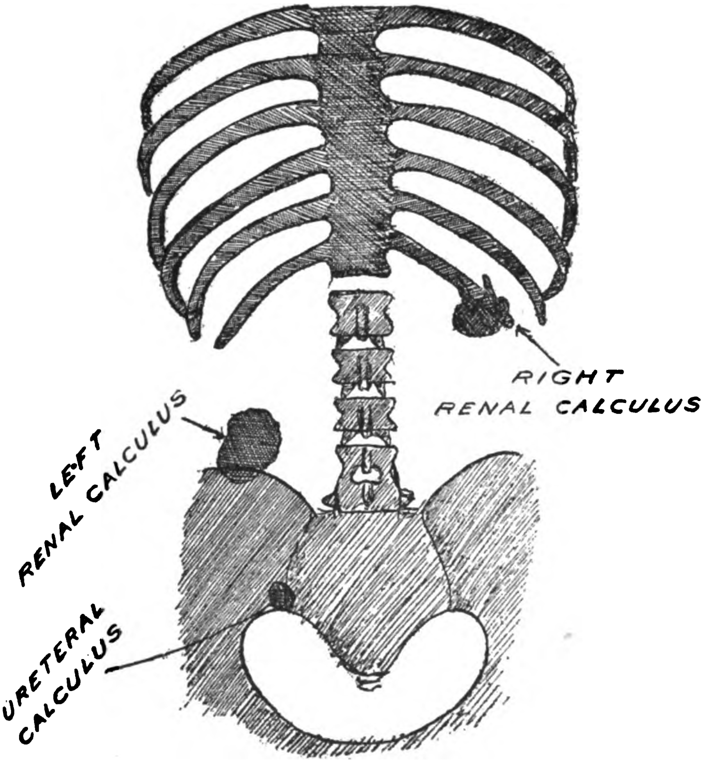

Fig. 2. Radiograph of Case II.

Operation April 14th. A long incision was carried along the external border of the sacro-lumbar muscles and extended over the iliac crest, thus exposing the colon, and then with a knife the purulent pocket was punctured and the pus evacuated. Through this opening digital exploration showed an immovable calculus so that the renal incision was enlarged and an attempt was made to seize the stone. This, however, proved to be possible after cutting through one of Bertin's columns. The renal pocket extended very low into the abdomen. The ureter was dissected down to the small pelvis at which point a calculus the size of an almond wedged in the tube could be felt, and on account of its immobility it was impossible to push it back, so that the wall of the ureter was incised over the calculus and the latter removed. No suture was made in the ureter and the pocket was partially plugged and drained. At this point of the operation the patient gave evidence of quite marked shock. The pyonephrosis was due to the ureteral calculus which obstructed the lumen of the canal. The left kidney which had thus become infected was painful and, although the right kidney contained calculi, it had not given rise to any symptoms. The calculus removed from the left kidney was in both size and shape that of a small hen's egg, it weighed 120 grams, and was composed of oxalate of calcium.

The ultimate result of the operation was good, the temperature never went up to any great extent, the general condition remained excellent, the patient voided his urine well and the latter had become clear, while a normal amount was voided and the lumbar pain disappeared. At the time of writing there was still quite an amount of suppuration going on in the incision so that the drainage tube was left in place, but no urine came from the wound.

I have only referred so far to aseptic lesions and to a certain extent mechanical, produced in the kidney by large calculi, but septic lesions may be present which usually complicate the diagnosis.

Pyelonephritis is not a frequent complication of large calculi, as their size causes little tendency to their displacement and consequently they inflict no traumatism upon the kidney. They do not obstruct the exit of the urine, and on account of their composition, they present a relatively aseptic condition, thus diminishing the chances of infection. However, uronephrosis, uropyonephrosis, and pyelonephritis with enormous dilatation of the pelvis, and a deposit of phosphates on the uric acid nuclei of the calculi may exist. Other than those very rare instances of primary phosphatic calculi, the presence of these salts in a calculus indicates an infection which usually undergoes its evolution discreetly as, for instance, in the case recorded by Sheild, following an already advanced renal sclerosis.

When the latency is complete calculi do not give rise to any appreciable symptom during life and chance alone permits one to discover them during autopsy, death having taken place from some other disease. In a certain number of cases, however, they give rise to some symptoms, somewhat different from those produced by small renal calculi, symptoms which are occasionally hardly remarked, while in other cases, they may be most deceiving. These are the cases which particularly interest us and which I shall attempt to study.

The functional symptoms of large renal calculi are pain and hematuria. They are to be found in most recorded cases, but are very slightly marked. The pain usually is seated in the lumbar region, or in the side of the abdomen, and this is one of the most constant symptoms. It may exist for a number of years and disappear for some time and then return in some other form. Usually it does not present any of the special characters belonging to renal lithiasis and is in no way influenced by walking or rest. The case recorded by Sheild is a beautiful example; the patient whose calculus weighed 594 grams, was an omnibus driver, his route being through the streets kept in very bad condition, but he was able to continue his work until he entered the hospital.

The pain radiates little, but, however, it may extend towards the stomach, or along the track of the sciatic nerve. The patients are more apt to experience the sensation of weight in the lumbar region, due to the weight of the calculus, and in the second case here related it simulated very painful and persistent colics lasting all night. In the first case also the pain arose suddenly when the patient bent over, and was seated in the sacro-lumbar mass, and was so severe that it was some time before the patient could straighten himself. Then again he could not lie on the left side without giving rise to an extremely painful, cramplike pain in the left flank.

Hematuria has no great signification. In certain cases it may be said to hardly exist, or, if so, only microscopically and it is only by a microscopic examination of the urine that it is detected. In some recorded cases, it may have occurred a number of years previously, usually intermittent in nature, but it is not always produced by movement or jolting and Hartmann has related a case of hematuria resulting from a calculus arising in a patient who was wearing a plaster apparatus. And lastly, it may coincide with the appearance of a tumor which may render the diagnosis faulty.

In point of fact, in many cases, large calculi give rise to most deceiving symptoms sometimes, as in one case recorded by Raymond, symptoms of interstitial nephritis were predominant. In the case published by Reynier and in one recorded by Torres the patient complained of gastric disturbances. Sheild has recorded a case in which the appearance of a large tumor coincided with repeated and only slightly painful hematuria, so that the diagnosis of malignant renal tumor was made. Morris has reported a still more extraordinary case, that of a man who had a hard and bony tumor in the right flank, but exploratory incision proved that it was a renal calculus weighing 283 grams.

In the second case which I reported the diagnosis rather weighed in favor of a splenic tumor of a tuberculous or hydatid nature.

The calculus may become infected and give rise to a pyelitis, which simulates tuberculosis of the kidney, a diagnosis which would seem to be confirmed by the hematuria, pyuria, pain and increase in size of the organ.

The peculiarity or the absence of any symptom might seem, in the first place, paradoxal when one takes into consideration the size and weight of these calculi. It seems strange that instead of interfering more than the other forms do, with the renal function and producing lesions of its parenchyma, they remain silent and only give evidence of their presence, when they do at all, by slight or vague symptoms.

One of the most evident causes for this absence of symptom is the aseptic condition of large calculi. Reynier, Legueu and

Albarran have demonstrated that the kidney, like all other organs, offers a great tolerance for aseptic bodies. Now uric acid calculi, which represent the large majority of voluminous stones, offer these conditions far more than phosphatic stones, which are supposed to represent the result of a former infection.

Beside this, a large calculus must leave a free exit for the urine, thus avoiding uronephrosis and the accidents of retention. Large calculi have no tendency to give rise to these conditions, since they do not become engaged in the ureter and consequently do not obstruct it. These two conditions, however, are not sufficient to explain the latency of large calculi, and a third factor must be taken into consideration, namely, their fixity. This is the essential condition which diminishes or does away with hematuria and pain, symptoms of renal lesions, increased or diminished by movement and rest when the calculus is free in a normal or pathologic cavity.

This fixity of the calculus may be realized in various ways. In certain cases the stone develops in the midst of the renal parenchyma, thus realizing the ideal conditions of asepsis and fixity, up to that time when, on account of its large size, it ruptures the portion of the parenchyma separating it from the pelvis, thus realizing a hematuria which may pass by unnoticed.

In other instances the calculus appears to develop in the pelvis and then the interpretation becomes a more delicate matter. With Morton it may be admitted that the calculus develops in a calyx, from which it is only expelled when its size menaces obstruction of the lumen and functions of the latter, and it must also be admitted that when once the calculus is in the pelvis it develops very quickly in order to fill the cavity; and what is still more the calculus must be rounded, not of the coral type, thus avoiding injury to the pelvis and the hematuria which is the consequence of the latter.

These are, without doubt, merely hypotheses, and autopsy findings, although realizing the perfect latency, do not always fulfill these conditions. In cases where slight hematuria occurred ten or fifteen years previously, as in Reynier's case, it would seem, on the contrary, quite rational to admit this mechanism.

The diagnosis of large calculi is quite difficult, on account of their symptomatology and characters. Since the classical symptoms are wanting, such as nephritic colic, the very slight and temporary pain, and the inconstant presence of hematuria, it is impossible to come to any sure conclusion. Generally speaking, patients presenting large calculi are not markedly lithiasic; the attention of the surgeon is not even always attracted to the kidney, and many reported cases show that abdominal tumors formed by large calculi were considered as malignant disease of the kidney, liver, and vertebral column.

Occasionally, the only symptom of the calculus is a pain along the course of the sciatic nerve, or in the region of the stomach, occasionally on the side of the healthy kidney due to reno-renal reflex. Then, again, patients may complain of pain, although they have no calculus, especially the gouty, tabetics and in certain cases of nephritis.

The diagnosis will in most cases, however, be limited to one of three affections, namely, lithiasis, tuberculosis or cancer.

Now, large calculi never give rise to nephritic colic. They are rarely infected and this complication would not even enlighten the diagnosis, because pyelonephritis produces many symptoms which are common with renal tuberculosis.

Pain, when it exists, is manifested spontaneously and by pressure, but this symptom is also met with in tuberculosis and sometimes in malignant disease; it may also be due to a neuralgia having a different origin and whose characters must be searched for.

Hematuria gives no distinct information. When it increases or distinctly diminishes by repose, it is evidently a presumption in favor of calculus, but Hartmann has recorded a case where it occurred during repose, thus taking on the characters of a recurring congestive hematuria, as in tuberculosis and cancer. In other cases it does not exist.

Palpation of the kidney will hardly give any precise information. In tuberculosis and cancer, as in lithiasis, there is always a fatty or sclerous perinephritis, according to the case, which gives rise when palpated to the sensation of a tumor, almost painless in cancer, painful in tuberculosis. In certain cases of calculi, on the other hand, the increase in the size of the kidney is not always very perceptible. It would seem that the apparition of a tumor is often due to hydro or pyonephrosis, more than to the calculus itself, as in the second case here recorded, in which a large tumor was made out.

Pain does not always exist, even on pressure, and one may find a very large tumor, having a silent evolution, which may cause an erroneous diagnosis.

Examination of the urine should always be made, because it will frequently give much precious information. The total amount of urine is not sensibly changed in general in lithiasis, tuberculosis or cancer. Albumin may be present in any of these three conditions, because there is nearly always a co-existing nephritis. When there is hematuria a cystoscopic examination will show which kidney is involved, although microscopical examination, after centrifugation, will give results in certain cases by revealing the presence of Koch's bacillus, or carcinomatous cells. This, however, is not a certain means, because in closed tuberculoses the bacilli are not often found in the urine and it is rather rare to find carcinomatous cells in this fluid.

In the absence of any precise information the diagnosis may be based on the symptomatic ensemble, the evolution of the disease which is rapid in cancer and tuberculosis, and one should search for secondary lesions, but this is a precarious resource, which is apt to compromise all therapeutic measures.

In order to control the diagnosis when it is uncertain, to come to some conclusion in the majority of cases when it is faltering, there is still another means of recent date, which gives promise of giving marvelous results. I refer to radiography. In 1903, Beclère pointed out the difficulties in the technique and the means to remedy them. What appears to increase the difficulty in radiography of the kidney is partly the thickness of the abdominal wall and the location of the kidney near the vertebral column. The difficulty is also increased when the size of the calculus is small and an unusually thick abdominal wall. Phosphatic calculi are the easiest to discover and after these oxalic acid calculus and lastly uric acid calculus.

Beclère insists on the advantages of stereo-radiography. This method permits affirming that a spot existing on both plates and possessing the same shape in each along with the same dimensions, is not accidental; besides this it allows one to affirm that the spot occupies in space a more anterior plane than the transverse apophyses of the lumbar vertebrae. According to Schomberg, a satisfactory result must distinctly show the last ribs and the transverse apophyses, as well as the contour of the psoas muscle.

In 1904, Lester Leonard pointed out the importance of the X-ray as a means of diagnosis, and he esteems that in more than 97% of cases it will give a positive result. He concludes that the results furnished by the X-ray in renal calculi permits of their differentiation from any other pathologic process, more exactly, precisely and clearly than by any other method.

The X-ray facilitates surgical interference by exactly locating the stone or stones and showing their number and size. By this distinct diagnosis the incision may be limited, consequently diminishing the operative shock and traumatism. It also is the means of avoiding the danger of doing nephrectomy or any other serious interference on a diseased kidney when the second kidney is the seat of the lithiasis and in cases of renal reflex it also prevents an erroneous diagnosis as to the side in which the stone is present.

In the first case here reported, the picture revealed an opaque shade in the right flank, this point corresponding to the painful spot found on renal palpation. In the second case it at once led to a diagnosis when the clinical examination was in favor of a splenic tumor, by showing the shade of a large calculus in the left flank. Besides it revealed the presence of a calculus in the ureter, and also furnished precious indications relative to the interference and opertive technique. It showed the presence of a painless calculus in the right kidney which was absolutely latent symptomatologically.

A CASE OF SARCOMA OF THE BLADDER.[1]

By GEORGE S. WHITESIDE, M. D., Portland, Ore.

PRIMARY sarcoma of the bladder is such a rare condition that it is worth reporting. This case was one I saw in consultation with Dr. Marsh of Portland, in November, 1905.

Mrs. R., age 57, has complained of bladder trouble for 5 years, worse the past year. Frequency, urgency and pain. Has lost 30 lbs. weight in a year. Looks aged, emaciated, and cachectic. Has had frequent vesical hemorrhages lately. Examined without an anesthetic, tenderness over whole hypogastric region. Considerable muscular spasm so that in spite of marked emaciation no growth can be made out. Bladder will only hold 50 c.c. of fluid. Cystoscopy attempted, but unsatisfactory. Vaginal examination shows much thickening of vesico-vaginal septum. Mucus and shreds of tissue can be washed out of the bladder.

Examination under ether two weeks later discovered a mass the size of a man's fist in the pelvis. Probably the bladder. Uterus cannot be felt. Operation not advised on account of the size of the tumor and poor condition of the patient.

Mrs. R., died Jan. 6, 1906. Autopsy showed the bladder to be filled with a new growth which infiltrated the bladder wall, but did not involve any other organ. Kidney pelvis dilated and cortical substance in large part absorbed. Ureters dilated to 1.25 cm. in diameter. No metastases found in any organ.

Comment on such a case is unnecessary. I have passed the drawing of the specimen around to show the character of the malignant tissue.

Microscopic examination proved it to be a spindle-celled sarcoma.

Dekum Building, June 5, 1906.

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[1] **Read at the annual meeting of the American Urological Association held in Boston, Mass., June 5—8, 1906.**

EDITORIAL

THE VALUE OF THE PRESENCE OF UROBILIN

AMONG the many urinary bodies there is not one which has given rise to so much controversy, or which has been the subject of so many theoretical discussions as urobilin. At the present time the many exaggerated ideas relative to this body have been overthrown and urobilin has lost much of its former importance. In practice search for urobilin is made in diffierent ways, but the method of ammoniacal zinc chloride is perhaps the one most resorted to. A 10% solution of chloride of zinc, containing just enough hydrochloric acid to render the liquid limpid, is made and then a 25% ammonia solution is prepared. Five cubic centimetres of the zinc solution is placed in a graduated test tube and to this is added 20 cc. of urine, after which from 3 to 4 cc. of the ammonia solution is added, after which the mixture is filtered. The filtered alkaline liquid will be fluorescent if urobilin is present.

To this chemical procedure should be supplemented a spectroscopic examination; urobilin gives a band of absorption situated in the green and the blue between the B. and F. rays. The borders of this band of absorption are not as dark as its centre. To properly examine urine containing urobilin by this procedure, the urine should be shaken up with an equal amount of pure ether, as the latter dissolves the urobilin; a few drops of alcohol are then added and the urine is decanted; it is in the alcoholized ether that the disc of absorption of the urobilin should be searched for.

Urobilin should be distinguished from other urinary pigments, particularly urochrome. Louis Lemaire (thesis, Paris, 1905), has established some order in the distinction of these urinary pigments and he states that there is only one body which merits the name of urobilin. The so-called abnormal urobilin, pathologic or febrile, are merely mixtures of urobilin with pigments representing incomplete transformation of bilirubin, while purified stercobilin is identical with urobilin. The pigment of urobilin in part corresponds to what was formerly called urohematin by Harley, and Simon's hemaphein; consequently it is to be found in the urine termed hemapheic by Gubler. This urobilin has been found in an isolated condition, or in the form of chromogen or reduced urobilin in organic liquids. In a normal condition the urine contains reduced urobilin, but when pathologically altered the pigment itself is found in the urine. Under these circumstances one is dealing with patients the possessors of some affection of the liver, in which the hepatic cell is insufficient to arrest the poisons. It is especially under these circumstances that urobilinuria exists, but traces of urobilin may be detected in the urine of various pyrexias or intoxications. Its presence is almost constant after hemorrhage with retention of blood in the tissues.

From all this it is readily conceived that the origin of urobilin is very variable. All the theories which have been emitted to explain its presence, such as the intestinal, hepatic, histogenic or renal, have been contradicted. The various authorities have wrongly included the formation of urobilin and urobilinuria in the same explanation.

Now, the formation of urobilin is not necessarily in direct relation with the urinary elmination of the product and both these factors should be considered separately. Physiologically the origin of urobilin appears to be in the last portions of the small intestine and in this portion urobilin is formed from the normal biliary pigments which gather there.

Pathologically when the complete arrest of the biliary circulation arises, urobilin is formed in other parts and, under these conditions, it arises in the tissues themselves. It is due to a transformation of bilirubin, from the bile circulating in the blood into a less toxic body than urobilin or its chromogen. This is not the only origin, because in other circumstances urobilin originates directly from the blood when absorption of an hematic collection has taken place, due to the transformation of hemoglobin.

There is no longer any need of discussing the importance of the liver or the kidney in the formation of urobilin, because neither appears to take part in its formation, but they, however, play a primordial part in its elimination. Urobilin having a digestive origin should go through the hepatic parenchyma by way of the portal system. Now, if the liver is healthy, it transforms this pigment, but if, on the other hand, it should be diseased, its protective part is nil and it allows the urobilin to pass, from which fact the entire vascular system becomes invaded by this product, after which it is eliminated by the urine. Consequently this urobilinuria is the expression of an hepatic insufficiency. In other cases urobilinuria is merely temporary and only indicates an exaggerated destruction of the blood or biliary pigments. The kidney, as an eliminating gland, also plays a certain part. A lesion of its parenchyma may be accompanied by a simple permeability to chromogen, if the lesion is mild, but if, on the contrary, it is marked, an absolute impermeability will result, so that one will have a urobilinhemia without urobilinuria, from which arises a certain prognostic importance. The absence of urobilinuria in a urobilinogenous affection like pneumonia, and especially the absence of chromogen, should cause one to fear the consequences of renal impermeability, so that the clinical research for this pigment will allow one to judge the process of globular destruction, as well as to appreciate the functional value of the liver and kidneys.

BOOK REVIEWS

Text-Book of Genito-Urinary Diseases. By Dr. LEOPOLD CASPER, Professor in the University of Berlin. Translated and Edited with additions by Charles W. Bonney, M. D., Philadelphia, 1906. P. Blakiston's Son & Co., Publishers.

A review of this most excellent work on urological affections and pathology is hardly necessary, as it is at the present time both a familiar and admittedly authoritative book. Suffice it to say, that, with the exception of a few errors in the spelling of proper names, the translation is very readable, while the additions made by the editor are highly judicious and important, bringing the book quite up to date.

The illustrations, of which there is a plenty, are good, while from the standpoint of the publisher there is nothing to be desired.

Genito-Urinary Diseases and Syphilis. By HENRY H. MORTON, M. D., Clinical Professor of Genito-Urinary Diseases in the Long Island College Hospital. Illustrated with 158 Half-tone and Photo-engravings and 7 Full-page Colored Plates. *Second Edition, Revised and Enlarged.* Price, $4.00. F. A. Davis Company, Publishers, 1914-16 Cherry Street, Philadelphia, Pa.

The first 373 pages of the book deal with genital and urologic diseases; the remainder treats of chancroid and syphilis. Why syphilis should find a place in a work on genito-urinary affections is a question, as they have no connection with each other, the first belonging to internal medicine, the latter being strictly within the domain of surgery.

The book as a whole is not a bad compendium, but to our way of thinking there is much to be revised. For example, on page 433 the statement is made that: "in most cases (syphilis) the infectious element has disappeared after the lapse of two years." This teaching is bad and, as Fournier has recently shown, it is unsafe to consider a person as non-contagious in less than six years. The author states on the same page that: "The lesions of tertiary syphilis are not contagious," when in reality undoubted cases of contagion from certain tertiary lesions have been recorded by both French and German writers.

Most of the illustrations belong to past days and would probably be familiar to the practitioner of twenty-five years ago.

Studies in Urological Surgery. The Johns Hopkins Hospital Reports,
Volume XIII. By H. H. YOUNG and Assistants.

Volume XIII of the Johns Hopkins Hospital Reports consists of a series of studies on urological subjects emanating from Young's Clinic at Baltimore and is either his work or essentially due to his inspiration. The standard which the previous volumes of these Reports have set, is so high that we have come to expect a high degree of scientific excellence. It may be said at the outset that this volume will hold its own with its predecessors and the author is to be congratulated upon the results of his efforts. The number of separate papers is so great that no adequate review of the volume can be made except by considering them separately and in detail.

I. *The Seven Glass Test.* By H. H. Young. In this paper is described a method of localizing disease of the urethra and its appendages. It is a combination of the three glass test and the irrigation test, and goes, in fact, but one step further than the five glass test of Kollman. Briefly the technique is as follows:

The anterior urethra in front of the suspensory ligament is irrigated with a glass nozzle, the urethra being compressed between the fingers of the patient. The first glass tests the shreds from the anterior urethra if any exist. The second glass should be clear, showing that the urethra has been washed clean. The irrigating nozzle is then passed into the bulb and the third glass contains the washings from this part of the urethra. The fourth glass should again be clear, showing that the whole urethra in front of the triangular ligament is clean. The patient then empties his bladder into three glasses successively which show the condition of the posterior urethra and the bladder. The last glass, No. 7, should contain the plugs squeezed out from the prostatic glands by the final contraction of the prostate.

The article also deals with the methods of localizing disease in the prostate and seminal vesicles.

To those who regard the irrigation of the urethra in the presence of acute or subacute inflammation even with a soft catheter, as a source of danger, the use of a stiff glass nozzle, 10 cm. long, fitted with a rubber shield to catch the washings and direct them into the glass, will come somewhat as a shock.

While such an apparatus in the hands of Young and his assistants is doubtless free from danger, it may be doubted whether it is an instrument safely to be entrusted to the student or to the general practitioner.

We must also confess that Dr. Young's objections to the use of the soft rubber catheter for the same purpose, are not quite convincing. The whole technique is one which will be of value to the specialist when careful localization is necessary and might be used to advantage in Clinics where skilled assistants are to be had. It is, however, complicated, valuable only when accurately carried out and will be of doubtful benefit except to the well-equipped specialist.

II. *The Possibility of Avoiding Confusion by B. Smegmatis* (*Smegma Bacillus*) *in the Diagnosis of Urinary and Genital Tuberculosis.* By Hugh H. Young and J. W. Churchman. The authors were stimulated to make this study on account of the occasional serious errors in diagnosis due to the above-mentioned confusion. The paper is a very careful, painstaking review of the present knowledge on the subject. They conclude that differentiation between the smegma bacillus and the tubercule bacillus by staining reactions and morphology is uncertain. They then show—

1. That the smegma bacillus is not uncommonly found in the male in the fossa navicularis.
2. That it is rare in the urethra behind that point.
3. That it is not found in the bladder or posterior urethra.
4. That by irrigating the urethra with the special nozzle described in the previous article these sources of contamination may be removed.
5. That after cleaning the glans and washing the urethra red-staining bacilli found in the urine are certainly tubercle bacilli.

They present data and careful work upon all these points. Their remarks upon the value of animal inoculation seem somewhat sweeping and can hardly be accepted. They say that "Animal inoculation is a tedious method and this is sufficient to condemn it if an equally sure method can be provided in its place. It may, of course, be necessary when no red-staining organisms can be found."

It is not clear that the method which they have supplied is an "equally sure method," for the reader will be impressed with the apparent ease with which these trained men find red-staining organisms. Other less accurate observers have at times been seriously put to it to find the tubercle bacillus even when it was well known to exist in the urine and many observers are of the opinion that a guinea pig will show tubercular lesions in cases in which considerable study has failed to demonstrate bacilli in the urine. It seems, therefore, that the method of inoculation should be given a somewhat more prominent place than they have assigned to it. Not the least valuable part of the article is a full bibliography.

III. *Urethral Diverticula in the Male with Report of a Case.* By Stephen H. Watts. The case reported is one of perineal diverticulum following traumatic rupture of the urethra. The diverticulum was situated in the perineum, was about 6x5 cm., and connected with the urethra by an opening I cm. in diameter. It was cured by perineal section by Dr. Young, cutting away part of the sac and suturing the remaining portion over an inlying catheter. The remainder of the article consists of a collection of reported cases of the several varieties of diverticula and a careful review of the literature. The article is valuable rather as bringing our knowledge of the subject together in a convenient form than as adding anything especially new.

IV. *An Unusual Case of Urethrorrhagia.* By H. A. Fowler. This article is a careful report of a patient of Dr. Young's with extensive varices of the anterior urethra from which the hemorrhage was persistent and alarming. Perineal section with the creation of a urinary fistula behind the lesion and the constant presence of a large, soft rubber catheter in the anterior urethra failed to check the bleeding. It was finally cured by electrolysis with a copper electrode in the urethra. The copper salts thus deposited upon the mucous membrane acted as a powerful styptic and gave a satisfactory result, the patient remaining well eight months later. It is a full report of a rare and interesting case cleverly handled.

V. *Paraurethritis. An Anatomatic Review with a Report of Two Cases.* By John W. Churchman. After reviewing the anatomy of the urethral glands and discussing current knowledge of paraurethral gland-like structures, Churchman reports in detail two cases of gonococcus infection of paraurethral glands. The infection was finally overcome without surgical intervention, though only about after a month of treatment. The author does not appear to think favorably of excision of these glands though by this means radical cure has been obtained in a much shorter time. The article contains nothing new.

VI. *The Use of Ointments in the Urethra in the Treatment of Chronic Urethritis. Presentation of a New Instrument for Depositing Ointments.* By Hugh H. Young. The value of this article is chiefly suggestive. Young has devised an ingenious instrument for depositing ointments in the urethra and one upon which they may be massaged into the tissues. His remarks upon the choice of ointments are not supported by sufficient clinical evidence to make them of great value. The impression remains in the reader's mind that the writer is himself by no means sure how much benefit we may expect from the use of these preparations; a thing to be regretted, as we are much in need of reliable data upon this point.

VII. *The Treatment of Stricture of the Urethra.* By H. H. Young and John T. Geraghty. This is an article of sixty pages based upon the study of four hundred cases. In the early pages an unnecessary amount of time is spent in demolishing the ghost of Otis' teaching, which is now too thoroughly discredited to require such heroic treatment. The writers are in general in accord with the accepted doctrine that gradual dilatation is the method applicable to the great majority of cases. They regard internal urethrotomy as applicable to comparatively few cases except those of stricture at or near the meatus. Here again, too much energy is spent in opposing the teachings of Otis.

Seventy-nine cases were treated of external urethrotomy. The method employed in recent years being to excise part of the scar tissue about the urethra in the hope of diminishing the total amount. The results seem to be rather above the average, only twelve of thirty cases in which the result is known having shown a definite recurrence. But this report is based largely on the opinions of the patients, which are notably unreliable.

In regard to mortality, exception must be taken to his method of figuring it. After saying, "The absence of operative mortality in the 79 cases shows the simplicity of the procedure," and "In the 79 cases in which external urethrotomy was performed there has been no mortality," he incautiously adds, "Six patients died of complications already present: urinary extravasation and septicaemia, 4; prostatic hypertrophy and pyonephrosis, 2."

When once a surgeon undertakes to decide what cases that died after operation should be eliminated from operative deaths, he treads upon treacherous grounds. It would be more in the line of other writers if the mortality of his cases of perineal section were placed at 7 per cent. instead of 0 per cent. The latter figure clearly does not represent the real risk, and is likely to lead those less well informed to underestimate the danger.

VIII. *The Treatment of Impermeable Stricture of the Urethra.* By Hugh H. Young. In this article Young proposes to attack difficult cases of impermeable stricture of the urethra by opening the urethra behind the stricture instead of doing a retrograde catheterization by suprapubic cystotomy. He incises the apex of the prostate by means of his dissection for perineal prostatectomy, opens the prostatic and beginning of the membraneous urethra and locates the position of the urethra at the stricture, working from behind forward. It may fairly be doubted whether the operation is quite as simple as it appears, especially after a fruitless search for the anterior opening has confused and contaminated the field. We fear that those less familiar than Dr. Young with the position of the apex of the prostate might get confused and it it is not quite clear why it should be so much easier to find the posterior opening of the stricture at the bottom of a deep bloody hole than it was to find the anterior opening. As this operation has been done upon only one reported case, we shall await the results of his subsequent experience with interest.

IX. *The Treatment of Bacteriuria by Internal Medication.* By John W. Churchman. Churchman has undertaken the study of the value of the so-called "urinary anti-septics" in the prophylaxis and treatment of bacteriuria. He concludes that—

1. Internal medication is clearly indicated both in prophylaxis and treatment of bacteriuria and this quite independent of any effect it may have on the pyuria or symptoms.

2. The formalin-containing drugs are superior to the other two (methylene blue and salol).

3. Internal medication acts essentially by preventing bacterial growth and may therefore be expected to accomplish more by way of prevention than by way of cure.

4. In incipient bacteriuria without cystitis success from internal medication is the rule and failure the exception; in long-standing bacteriuria, and especially if cystitis be present, the reverse is true.

5. The efficiency of internal medication in bacteriuria varies not only with its duration and with the presence of accompanying cystitis but is definitely conditioned also by the character of the invading organisms. The prognosis is distinctly worse for staphylococcus and colon bacteriuria than for typhoid or streptococcus bacteriuria.

His results are in accord with other recorded views on the subject.

X. *The Use of the Cystoscope in the Diagnosis of Diseases of the Prostate.* By. H. H. Young. Young's object in this paper is to controvert the "oft repeated assertion that the cystoscope is of little or no value in cases of prostatic hypertrophy" and other forms of prostatic diseases. He uses much of the data contained in his paper of 1904 on the same subject and particularly his scheme for recording cystoscopic views. He adduces many detailed case-reports in support of his belief in the value of such records not only in diseases of the prostate but in other diseases of the urinary apparatus.

With his conclusion in regard to the value of the cystoscope we are in entire accord and believe it to be the view held by the majority of those whose opinions are competent. The importance of accurate records may also be admitted without question but the value of his method is less clear. It depends very much upon the dexterity of the observer and is likely to be grossly misleading in the hands of the inexpert. We doubt if it will be widely helpful.

XI. *Chronic Prostatitis.* By Hugh H. Young, John T. Geraghty and A. R. Stevens. This article is a scholarly study of the subject based upon 356 cases. The pathological conditions have been carefully studied and the results are valuable. Under the head of "Symptoms," their study of "referred pain" particularly in relation to the nerve supply, is an excellent contribution to a neglected part of the subject.

In treatment, massage is regarded as of prime value and we are glad to find that they insist on the importance of irrigation of the urethra and bladder after massage to prevent infection. Some exception might be taken to such advice as

"If done (massage) without using a considerable degree of pressure the procedure is practically useless." It has been the experience of others that too great force rather than too little was the error to which most general practitioners are liable. By those as expert as Dr. Young and his assistants an amount of force may be used which would lead straight to trouble in the hands of others.

Under the head of "Operative Treatment" some new and important suggestions are made. Young has operated on four cases of the "non-obstructive" type and is enthusiastic over the results. Some of his reasoning does not, however, appear quite sound. Thus in comparing operative treatment with massage he says, "Where there is very excessive infiltration of the periglandular stroma and the formation of fibrous tissue as generally shown by considerable enlargement, irrgularity and induration, it is ridiculous to expect to restore the prostate to normal by massage although it is remarkable how much can be accomplished by these means." It will hardly be argued that to remove the gland will restore it to normal and it is therefore at best a choice of evils. Again he says, "The results obtained by means of this partial and conservative prostatectomy have been splendid, and speak very strongly for its employment in a greater number of cases. The fact that the sexual powers are not interfered with, and that actively motile spermatzoa, capable of impregnating are present in the semen, shows that no objection to the operation on account of fear of loss of sexual puissance should exist."

Though the senior author may be able by his perfect technique always to avoid injury to the ejaculatory ducts others will often fail to do so and the operation cannot be said to be devoid of danger to the sexual apparatus.

Though we may differ in minor points there is no doubt that the article is very valuable and perhaps the most generally helpful one in the volume.

XII. *A Modern Method for the Performance of Perineal Lithotomy.* By Hugh H. Young. Young, in this article, discusses the choice of operations for uncomplicated stone of the bladder. He quotes statistics to show that the mortality of perineal lithotomy is much lower than that of suprapubic lithotomy—though no reason is given for believing that the type of case subjected through the different operations was the same. He then goes on to show also by statistics that the mortality of perineal lithotomy is lower than that of litholopaxy, a conclusion so much at variance with accepted doctrines as to recall the hard name by which statistics are often characterized. He concludes that the chief objection heretofore urged against perineal lithotomy is that it is a blind operation, but that by employing a technique similar to that of his operation for prostatectomy this objection is removed. He seems to forget that to the general surgeon—to whom this paper appears to be addressed, as the trained genito-urinary surgeon will probably prefer the safer operation of litholopaxy—the suprapubic operation is far more familiar and therefore a relatively safer procedure.

The article is disappointing as showing doubtful appreciation of the field to which litholopaxy is peculiarly suited and the reasons which have made the suprapubic route more popular than the perineal.

XIII. *The Operative Treatment of Vesical Diverticula with Report of Four Cases.* By Hugh H. Young. This article is an interesting, able and timely discussion of a rather neglected subject. Nine cases were studied but on account of their condition in only four were the diverticula treated by operation. In one the septum between the bladder and the sac was divided and in the other three various methods of excision were employed.

In discussing treatment he reviews the methods which have been employed and concludes that excision is the only one likely to stand the test. Not only are his own cases reported in detail but also the cases of excision of diverticula by other operators.

On the whole it is the most original and brilliant contribution in the collection.

XIV. *A Case of Double Renal Pelvis and Bifid Ureter.* By Hugh H. Young. A detailed report of an interesting case in which erroneous diagnosis caused by a rare anomaly was followed by death after operation.

XV. *Pyonephrosis Due to Bacillus Typhosus.* By Hugh H. Young and Louis C. Lehr. A careful study of two personal cases and three other cases found in literature. The fact that they found only eight reported cases makes the work interesting, timely and important.

XVI. *The Use of the X-Ray in the Diagnosis of Renal and Urethral Calculi.* By F. H. Raetjer. This is a study based upon 291 cases examined at the Johns Hopkins Hospital. The author's conclusion "that with good apparatus and technique calculi, when present, can practically always be found," is in accord with that of most competent observers. The article contains nothing essentially new.

XVII. *Nephritis and Haematuria.* By H. A. Fowler. Fowler's paper is based upon one case of serious hematuria from a kidney showing changes consistent with chronic nephritis.

He gives a good summary of the literature and a full bibliography.

XVIII. *The Microscopic Structures of Urinary Calculi of Oxalate of Lime with Special Reference to the Spiculated Variety.* By H. A. Fowler. A careful study of an unusually fine collection of calculi is here presented. Many excellent drawings illustrate the complication of structure with which the author is chiefly concerned.

The article will be valuable to those interested in this rather technical question.

XIX. *Cystinuria with Formation of Calculi.* By H. A. Fowler. After reporting a case of a vesical calculus composed of cystin in which cystinuria persisted after operation, Fowler discusses the present state of our knowledge concerning the origin and composition of cystin.

XX. *Post-Traumatic Atrophy of the Testicle.* By John W. Churchman. Churchman reports an interesting case of a boy of 19 in whom careful examination was made of an atrophic testicle following trauma. The microscopic picture differed radically from that described by others in experimental atrophy, the tubules being well preserved. As no other case could be found in whuch the histological examination had been made, it could be compared only with the experimental cases.

His findings suggest that these atrophic glands may not be entirely functionless. The case is well worked up, opens an interesting field for speculation and is accompanied by a full bibliography.

XXI. *A Description of the Dispensary Devoted to the Treatment of Genito-Urinary Surgical Cases at the Johns Hopkins Hospital.* By Hugh H. Young. The last article in the volume is a well-illustrated description of Dr. Young's Dispensary and the way in which it is utilized for teaching. It will be of interest to those wishing to study equipment and organization.
enthusiasm with which the head of the Clinic inspires those around him and in

Taking this collection of papers as a whole, the striking thing about it is the masterly way in which the material has been used. Though the Clinic is good and the quality of the assistants unusually excellent, these facts are not in themselves sufficient to account for the results. The explanation is to be found in the an atmosphere congenial to work.

Hugh Cabot.

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SYMPTOMATOLOGY OF MALIGNANT DISEASE OF THE RENAL PARENCHYMA IN THE ADULT.[1]

By EDGAR GARCEAU, M. D., Boston, Mass.

MALIGNANT tumor affecting the kidney in the adult usually has a slower course than that of malignant disease elsewhere in the body. The tumor is frequently discovered by accident, either by the patient or by the physician who chances to make a thorough examination. Possibly the long duration may be due in part to the fact that tumors of the kidney often remain localized and are for a long time prevented from spreading by the resisting kidney capsule. If the chief cardinal symptom, hematuria, is absent, the tumor may remain undiscovered for many months without giving any other indication of its presence than occasional slight pain in the lumbar or hypochondriac region of the affected side. Perhaps also, the hypertrophy of the sound kidney has something to do with the long duration of the disease, for, as a result of this hypertrophy, the sound kidney takes upon itself the function of the two organs together, and the general health does not suffer in consequence of the inefficient action of an important organ of the body. Hypertrophy, however, sometimes fails to occur in consequence of a nephritis, and in these cases the duration of the disease is much shorter. Other causes, such as a peculiarly malignant type of tumor, poor physique, and unusually severe symptoms, may contribute to an especially severe course, and may lead to rapid death. Sooner or later, in all cases, the health becomes undermined, the patient loses strength, and emaciation and cachexia appear.

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[1] Read before the New England section of the American Urological Society at Boston, May 13, 1907.

The disease is most common between the ages of forty-five and fifty-five, and there seems to be no question but that the male sex is more prone to the affection than the female; another feature is that the female is affected rather earlier in life than the male. Albarran and Imbert (Les Tumeurs du Rein, Paris, 1903, p. 220), in an analysis of four hundred and two cases found two hundred and twenty-seven men affected and one hundred and seventy-five women.

The growth is rarely bilateral as a primary disease, and there is no special predominance as to side, although the right side is affected a little oftener than the left. Carcinoma and sarcoma are more frequently secondary than primary in the kidney. Morris (Surgical Diseases of the Kidney and Ureter, London, 1901, vol. 1, p. 549) found sixty-nine cases of malignant disease of the kidney in 3,926 autopsies; fifty-four of these were secondary growths and fifteen primary; of the fifteen primary tumors, thirteen were carcinomata and two adenomata. Kelynack (Renal Growths, London, 1898, p. 19) found in 4,505 autopsies from all causes, only nine cases, or .19 per cent., of primary renal growths. Riche (Dtsch. med. Woch., 1900, vol. 26, p. 121) found among 11,930 cases of malignant disease affecting the various parts of the body, eighty primary malignant growths of the kidney, which gives a proportion of only .7 per cent.

The chief varieties of tumor affecting the renal parenchyma are cancinoma, sarcoma, adenomata, and hypernephroma. Albarran and Imbert (Les Tumeurs du Rein, Paris, 1903, p. 16), in a series of five hundred and twenty-nine cases of renal growths in which histologic examination had been made, found thirteen adenomata, one hundred and ninety-nine carcinomata, ninety hypernephromata, one hundred and sixty-two sarcomata, fifty-nine mixed tumors, two fibromata, two lipomata, and two angiomata. Hence it will be seen that adenomata are extremely rare. It is more than probable that hypernephroma outnumbers the remaining tumors which affect the kidneys; at least, this is the opinion of most observers, especially pathologists, who have studied this question. Alberran and Imbert, in their work on renal tumors, are not inclined to give hypernephroma the prominence as a kidney tumor which most of the other observers have accorded it.

The symptoms of the different forms of malignant disease of the kidneys are practically identical, and it is almost, if not quite, impossible to distinguish the separate tumors apart during life. The same description, with the exception of a few unimportant differences, will serve for all.

In the beginning of the disease the general symptoms are not pronounced. A case is occasionally met with in which anorexia is the only symptom noted. The patient has a distaste for food, especially for meat, without discoverable cause. As a rule, the general health remains good for a long time. Metastases in other parts of the body occasionally serve as the first sign of the disease.

Malignant disease of the kidney presents at once three distinct cardinal symptoms, which are, hematuria, pain, and tumor. With all of these symptoms present, especially when the hematuria is excessive, and the tumor large, one instinctively turns to the diagnosis of malignant disease, particularly in a patient during middle life.

Although pain, hematuria and tumor are the three cardinal symptoms, yet they are by no means always present in the same case. The disease may be ushered in by any one of these symptoms, and the others may appear later.

Alberran and Imbert (Les Tumeurs du Rein, Paris, 1903, p. 286) found hematuria the sole cardinal symptom throughout the whole course of the disease but twenty-three times out of three hundred and fifty-seven cases, or 6 per cent.; while tumor, in the same number of cases, was the sole symptom in eighty-four, or 23 per cent. This peculiarity, namely, tumor without hematuria, was nearly twice as common in sarcomatous as in epitheliomatous growths. Imbert (Gaz. des Hôp., Paris, 1903, May 30, p. 632) found pain as the first symptom ninety-one times in two hundred and fifty-seven cases, or 35 per cent.

Pain is due to pressure on the nerves, to vascular engorgement of the kidney which exercises compression of the kidney substance, and also when it has the character of nephritic colic, to the passage of blood clot or a shred of tissue through the ureter. Another cause of pain is distension of the pelvis of the kidney, in consequence of blocking of the ureter by a portion of the malignant growth. Radiation of the pain to the abdomen, testis, buttock or thigh is not uncommon, and Rovsing (Arch. f.

klin. Chir., 1094, vol. 49, p. 430) relates the case of a woman forty-two years old, with malignant renal disease, who felt the pain in the right loin with radiation to the back part of the femur, and later to the labia major.

Hematuria is perhaps the most important and most characteristic symptom of kidney tumor; its occurrence excites immediate alarm, and directs the attention of the patient to the urinary organs which had previously been supposed to be in a normal state of health. It is a very frequent symptom, and Denaclara (Th. de Lyon, 1899, p. 45), in a series of ninety cases of new growth of the kidney, found hematuria in 75 per cent. of them.

The variety of tumor seems to have some influence with reference to the occurrence of hematuria. Albarran and Imbert (Les Tumeurs du Rein, Paris, 1903, p. 227) found that while epithelioma and sarcoma gave rise to hematuria in an almost equal proportion of cases in the beginning of the disease, yet, at a later period, hematuria was present as a constant symptom in 73 per cent. of the epitheliomata, 43 per cent. of the sarcomata, and 46 per cent. of the adenomata.

The hemorrhage comes on insidiously and without warning. The patient may have a sudden desire to urinate, and notices that the stream is blood red in color. Occasionally the attack is ushered in by a feeling of weight, or by a dull pain in the lumbar region. Frequently, however, the bleeding is entirely painless. Bodily motion seems to have but little influence with reference to the bleeding. An attack is liable to come on at night as frequently as it does in the day time.

The duration of the hematuria is variable; some patients may not pass blood more than a few times during the whole course of the disease; others may have an attack lasting a few months only, and the bleeding does not return until towards the end of the trouble.

The amount of blood lost is very variable; at times it amounts to only enough to color the urine red, while at other times the amount of blood lost may be so large as to simulate a true unmixed hemorrhage. Blood casts of the ureter are not uncommon, and large clots of variable size and shape are also seen; in these cases the clotting takes place in the bladder. It is astonishing to see how well patients stand the loss of blood, even when the hemorrhage has been going on for a number of days or weeks.

Heresco (Th. de Paris, 1899, p. 41) found tumor as the first sign of the disease in 23 per cent. of the cases.

The tumor may be so small as to escape notice, especially when situated in the upper pole of the kidney, its usual site. It may be of large size, and even fill the abdominal cavity.

The surface of the mass is often irregular and nodular. A small renal tumor is capable of slight movement, but large ones are usually firmly fixed. Pulsation has been noted in some cases and also bruit. These signs are important with reference to differential diagnosis in those rare cases of aneurysm of the renal artery.

The relation of the tumor to the intestines is quite important, but this has been somewhat overdrawn. The colon usually lies in front and to the inner side of the kidney tumor, and when distended with gas there is a distinct tympanitic note in front of it. In thin patients with lax abdominal walls, when the intestine is not distended with gas, a thick cord sometimes marks the direction of the colon. Exceptionally a right renal tumor may, in its growth, push the ascending colon downwards instead of forwards and upwards, while a left tumor may push it outward, and finally, a tumor of either kidney may push the bowel inwards towards the median line, in which event there is no resonance over the growth.

The best method of examining a renal tumor is that of Israel (Berlin klin. Woch., 1899, vol. 26, p. 126). The patient is placed upon the sound side, with the knees and thighs flexed, and is told to breathe slowly and quietly through the mouth, making an endeavor to relax the abdominal muscles. If the left kidney is to be examined the examiner stands behind him, at the same time facing towards his head. The fingers of the right hand are now placed flat on the left lumbar region, while the left hand is placed on the abdomen in such a position that the tips of the index and middle fingers will be placed at a point two fingers' breadth below the junction of the ninth and tenth ribs and cartilages. The patient is now told to inhale deeply, while the lumbar hand presses forwards towards the abdominal cavity; exactly at the time when inspiration goes over into expiration, the hand below the ribs compresses the abdominal muscles gently and firmly towards the lumbar hand; at the same time the abdominal fingers make slight movements of flexion and extension at the metacarpophalangeal joints in an endeavor to find the lower edge of the kidney which reaches its lowest point at the end of inspiration; when the kidney begins to ascend it slips by the abdominal hand, and can be recognized and any irregularity of its surface can be appreciated. The best time to palpate is just at the beginning of expiration, for it is then that the kidney begins to ascend, having reached its lowest point; at this time also the abdominal walls are most relaxed.

This method is especially applicable to small tumors just beginning to grow. Israel (Dtsch. med. Woch., 1896, vol. 22, p. 345) records a case in which a malignant growth the size of a cherry, situated on the anterior surface of the kidney, was palpated by this method, and afterwards successfully removed.

Symptoms on the part of the stomach are rare, and when they occur suggest metastasis. The disease is occasionally ushered in by gastric symptoms alone, as in the case reported by Rollin (Soc. Anat. de Paris, 1905, 6 s., No. 1, p. 98). In this case, that of a female fifty-two years old, there was almost daily vomiting in the morning, and this was the only symptom present. A hard, movable tumor of large size, under the right ribs, not associated with hematuria, made the diagnosis extremely difficult, cancer of the stomach was suspected, especially as there was an entire absence of hydrochloric acid in the stomach contents. Poncet (Lyon Med., 1897, vol. 85, p. 122) relates an interesting case, in which the first symptoms were gastro-intestinal, with urticaria of the lower extremities.

Dyspena is also an occasional symptom and so also is fever of the hectic type. Ascites and varices when present are due to occlusion of a venous trunk by the growth, and edema of the lower extremities has a similar origin; the last symptom has a serious significance, as it is usually seen toward the end of the disease. Jaundice has been noted in a number of cases, and it is due either to extension of the disease to the liver, or to obstruction of the lumen of the common duct in consequence of compression.

Varicocele, especially when it occurs on the right side, is extremely suggestive of renal growth, and should immediately lead to examination of the lumbar region. In examining for this symptom the patient should be in the erect posture, for if the patient is lying down the veins are not so likely to be distended, and slight degrees of engorgement may escape detection.

The urine does not vary much in malignant disease of the kidney, and barring the presence of blood, abnormalities are infrequent. The daily amount is normal, as a rule. Albuminuria is fairly frequent, and of course is abundant when there is much blood. Glycosuria has occasionally been observed. Casts and renal elements may be found on the diseased side when there is inflammation of the parenchyma around the growth. A nephritis of the kidney not affected by the disease is sometimes observed, as Albarran (Tr. Ass. Franc. d'Urol., 4 sess., Paris, 1899, p. 509) has pointed out, the nephritis here being due to general toxemia. Pus is found in the urine when there is coexisting pyelonephritis, but this is rare. Fragments of the growth in the sediment are of extreme diagnostic importance, but they are seldom found.

The diagnosis of malignant disease of the kidney is one of the most difficult to make. In arriving at a conclusion the subjective rather than the objective phenomena are most important, clinically speaking, and little reliance is to be placed on physical signs. A most careful analysis of the case is essential, and it is by weighing the symptoms in the aggregate rather than singly that a correct estimate of their importance may be gained.

The previous urinary history should be carefully inquired into, especially with reference to hematuria. The general state of the health of the patient is important; in the first stage of the disease the general health is usually excellent, and a history of gradual decline not subject to periods of better health is significant of malignant trouble.

A thorough physical examination will sometimes reveal a great deal. Examination of the lungs and liver should be made and a careful search for enlarged glands along the vertebral column, iliac fossae, groins, axillae, and subclavicular regions should not be neglected. Metastases should be searched for, as they are sometimes the first symptoms of the trouble. The presence of varicocele on the right side is significant.

In the absence of hematuria renal growth is unusually difficult to diagnose, and has been mistaken for almost every other form of abdominal enlargement. In arriving at a correct conclusion we are in many cases aided by noting the relation of the growth to the intestines. The relative position of the colon to the tumor, while it does not give all the diagnostic aid that has been claimed for it, yet is a distinct help in arriving at a correct conclusion. The ascending, transverse and descending colons form three sides of a square, thus dividing the abdominal cavity into four regions, a central, superior, right and left lateral. A tumor originating in one of these regions may crowd over into another, but only by pushing away the colon. The large intestine, as a rule, retains its position quite well in consequence of the fairly fixed nature of the mesocolon. Uterine and ovarian tumors must be in the central region, with the colon bounding them above and on the two sides. The kidney is normally situated behind the colon, and when enlarged by a tumor it must develop in the wall of the ascending or the descending colon; hence, the colon should be found in front of the tumor or towards its inner side. Tumors of the liver crowd the colon down and may override it; tumors of the stomach also crowd the colon down; while tumors of the pancreas almost invariably appear above the transverse colon, and in a few instances behind it. A tumor growing in a movable kidney may enter the central zone, but unless fixed it can be slipped back into position. Tumors of the adrenal push the colon forward and inward. The central region, besides uterine and ovarian tumors, may contain growths of the small gut, of the mesentery, omentum and also enlarged retroperitoneal glands. The spleen must be on the outside of the descending colon, and if greatly enlarged may override it entirely; there is no line of resonance between the kidney dullness and the vertebral spines, as there nearly always is in the case of splenic enlargement. Tumors ordinarily close to the abdominal wall may, in consequence of adhesions, be separated from it by the intestines. In these cases there will be tympany in front of them; tumors of the spleen, liver and uterus may present these characteristics, and especially tumors of the ovary.

A cystoscopic examination will show from which side the blood comes and will also eliminate those cases of vesical hematuria occasioned by a tumor situated at the orifice of the ureter and giving rise to hydronephrosis. This form of vesical growth may closely simulate renal tumor, inasmuch as if the growth is of considerable size complete blocking of the urethral canal may result, with secondary hydronephrosis.

Puncture and aspiration are mentioned only to be condemned. It is far preferable in cases of doubt to do an exploratory operation, rather than plunge a needle blindly into the body at the risk of injuring important organs, and perhaps causing sepsis.

The injection into the renal pelvis of a solution containing bismuth in suspension by means of a long catheter and immediately afterwards taking an X-ray picture of the growth, may serve to indicate its position and its relation to the renal pelvis. There is some danger, however, that the bismuth may subsequently form the nucleus of a calculus.

Voelcker and Leichtenberg (Munch. med. Woch., 1905, vol. 52, p. 1576) call attention to this danger, and also refer to the poisonous character of the soluble bismuth compounds, which contraindicates their use. They recommend instead a 2 per cent. collargolum solution as especially adapted for this purpose, this solution causing no irritation whatever, and giving a distinct picture which is equal to that given by bismuth in suspension. The injection into the renal pelvis serves a double purpose, that just mentioned, and also, as first pointed out by Kelly (Johns Hopkins Hospital Bulletin, 1899, vol. 10, p. 116), the information which it gives with regard to the character of the pain. If the injection causes pain similar to that occasioned by the growth it is corroborative evidence that the seat of the disease has been accurately located; if, however, the pain following the injection is decidedly different in character, a disease affecting some neigboring organ may be suspected.

Photographing the tumor with the X-ray is sometimes of distinct aid. Occasionally shadows of nodules of great density may be seen on the photographic plate, and in these cases it may be difficult to distinguish the disease from calculus of the kidney.

DISCUSSION OF DR. GARCEAU'S PAPER

Dr. Smith: While it is very easy to differentiate a tumor of the kidney on paper, I would like to speak of a case of one of our prominent physicians who had a cholecystitis and unquestionably a stone. He had a hard gall-bladder. He was not operated upon. Two and a half years ago he had pain in his right side and a palpable mass. He began running a temperature. He was carefully looked over by two men in New York, and by a prominent physician of Baltimore (Dr. Osler), as well as by some good men here in Boston. His temperature ran on and he had a positive Widal and consequently it was pronounced a case of unquestionable typhoid. The condition ran on, his urine showed a little pus but no blood, it was of normal gravity. The tumor became larger, it extended upwards, the colon was not in front of it. He was finally operated on by a surgeon in Boston. An exploratory incision was made and it was found to be a hypernephroma. Dr. Osler, and the professional men in New York and Boston all made mistakes, and so it should not discourage us if we sometimes fall into error.

DR. CHUTE: I do not think we ought to wait for a mass in these cases. I think statistics lead us astray. I believe that if we wait until we diagnose them by finding a mass, many of them will not get well, because metastases will occur. I should rather deplore the fact of bringing the question of mass up.

DR. CABOT: I am in accord with Dr. Chute's views in regard to the question of a mass. The only case I have seen in which recovery took place was a case in which no tumor was to be felt and in which the mass was about an inch and a half in diameter in the upper pole of the kidney. The only symptom was hemorrhage—hematuria—I have seen cases in which there were masses, in one of which the hemorrhage was supposed to be from a movable kidney and the other from a stone in the kidney, and both of these cases died within a year of metastases. I think the time within which these cases can be radically cured is narrow. To wait for anything beyond hematuria is almost certain to find us in the stage of the disease when extirpation of the tumor does not remove the disease.

With regard to the question of diagnosis. I saw a case a few months ago in which the diagnosis is still in doubt—no autopsy having been performed. This case was a woman of 42 years of age who had been losing strength during the summer. I saw her in September. She was a working woman. She had seen her family physician, who discovered a large tumor in the right upper quadrant of the abdomen. It was in the region of the liver and was regarded as an hepatic tumor. I saw her three weeks later and the mass was fully six inches in diameter. The noticeable thing was a deep notch about opposite the cartilage of the ninth rib. The colon, on inflation, did not tend to go in front of the tumor. There was a distinct area of tympany. There was no jaundice and no blood in the urine, this fluid being substantially normal. The tumor continued to increase in size, and the woman died early in January. During the last two weeks of her life intense jaundice was present. Another surgeon regarded it as a tumor of the liver. I regret to say that I don't know what it was.

Dr. Johnson: Regarding the symptoms of hematuria I had a unique case in which the only symptom was passing of blood for eight months both during the day and during the night. There was not particularly marked frequency of urination, there was no loss of flesh, but the urine was quite bloody when drawn from the bladder. I washed out the bladder; there was no vesical growth to account for it. I did cystoscopy. In both of the kidneys after the first lavage the urine showed a mild pyelitis, not a pyelonephritis. The kidney the patient complained of was on the left side. It was tender but not swollen, the other gave rise to no symptom whatever. The urine from the right kidney showed a marked pyelitis. After three renal lavages and the administration of stypticin only, to my utter astonishment the bleeding stopped on the left side but there were lots of oxalate of lime crystals which might be called oxaluria (?). On the right side, where there had been no pain at all, he had an attack of pain in the right kidney. He evidently passed concretions and the bleeding began on the right side. Now there was a switch off from hematuria. Of course, I thought of hemorrhage from the kidneys. I did not find any kidney elements. After two or three lavages on the right side he gave in to the same sort of treatment and the hematuria stopped entirely. This was a case of a man 43 or 44 years old, the first thought was a growth, but the microscope did not sustain it. The microscope showed only oxalate of lime crystals which are nasty things to pass down and always leave irritation. As long as he has recovered, I did not think I would continue with the treatment. It was funny that it stopped so suddenly and switched from one side to the other. It would have seemed that the diagnosis of some sort of a growth would have been justifiable.

Dr. Foster: I would like to ask whether there is any significance in fullness of the veins of the lower extremity. I have had patients complain of fullness in their lower extremities previous to their attacks in tumors. I wondered if that was a symptom.

Dr. Davis: I saw a case last week where there was a suspected tumor of the right kidney in a negro 50 years old, who complained of hematuria for about two weeks. The right kidney was palpable and not tender. He was in the medical wards of the Massachusetts General Hospital. They asked me to cystoscope him. He passed urine while I was there, the urine was dark, with clots in it. I introduced a cystoscope and washed out the bladder which contained no blood, and looked at his bladder which was absolutely normal. Both ureter ducts were normal. I could find no source of bleeding and from the time of that cystoscope examination there has been no blood. I think probably this bleeding did come from the right kidney. I think it is one of these cases which illustrates how suddenly the hemorrhage stops. The blood in the bladder was evidently old blood. I think the hemorrhage stopped at that moment.

I did not use a ureteral catheter because I could see the jet coming from the ureter and it looked normal, and I thought the finding of a few blood corpuscles would not prove that the bleeding did come from the kidney but would mean trauma from the introduction of the catheter.

Dr. Cumston: In speaking of renal tumors on the left side, two instances come to my mind. The first one was a physician's brother, who came down from Nova Scotia in quite a hurry, having developed a rather large mass which occupied the left half of the abdominal cavity. The urine was absolutely normal; the blood count, unfortunately, was not made, but I diagnosed from the general condition of the man and the symptoms present, malignant tumor of the spleen. Dr. Watson saw the case and agreed with my diagnosis and was also present at the operation. I would say that the large intestine was pushed toward the median line, the tumor occupying the entire left half of the abdomen; but on opening the peritoneal cavity, it proved to be an enormous growth of the left kidney, involving the diaphragm and extending into the pelvis. The abdomen was closed, as the neoplasm could not be removed.

The second case illustrates the fallacies in diagnosis. This patient was also a brother of a physician. He presented a tumor filling the left half of the abdominal cavity. It was dull all over it—I am now speaking from memory. The urine was port-wine colored and contained a large number of red blood corpuscles. I made a diagnosis of malignant disease of the left kidney, and the patient was seen in consultation with Dr. Sumner, who thought it was primary tuberculosis of the spleen. However, having questioned the patient, who was 28 years of age, and he having denied syphilis, I suggested an exploratory incision, which was made. Getting down to the peritoneum, the growth was found adherent to this membrane. Sections were sent to Dr. Leary, who reported that it was a round-cell sarcoma; the organ from which it came he could not say. Therefore, Dr. Sumner and I agreed that the diagnosis of malignancy was correct. I again questioned the patient regarding syphilis, which he denied. Therefore, having put it to him that he had 99 chances out of 100 to die if the growth was removed, he consented to take his chance with an operation. On getting into the abdominal cavity, everything was massed together, there was no head nor tail to anything; the small intestine seemed to be imbedded in a greyish mass. The abdomen was closed, patient was put on mercurial treatment, and the tumor disappeared in about three months.

Dr. O'Neill: I think, in speaking of the early diagnosis of renal tumor, that in certain cases it can be done by elimination. I have a patient now whom I first saw three weeks ago. He has had hematuria for about four months. It is never very profuse, not sufficient to clot in the bladder. I cystoscoped him and found bleeding from the left side.

His urine has been examined both while he is bleeding and while he is still, when he is not bleeding. Then there is no albumin and no evidence of nephritis. While he is bleeding there is nothing to be seen but blood and the albumin due to the blood. No tubercle bacilli have been found; it is too short a time for inoculation tests to give us results. He has a slightly palpable kidney on that side; the X-ray examination by Dr. Percy Brown was negative. I think we are justified in submitting him to an operation for tumor of the kidney, and believe it is the most probable thing unless we have an instance of idiopathic hematuria.

Another case: Very large, stout woman from Canada. Family history: mother had the same disease that she had—an enormous tumor in the right side. She had a rather foul cystitis. She had a papillomatous growth above the ureter on that side. She was in no shape for operation—sugar in the urine, etc. I think that was a hypernephroma with extension down the ureter.

Dr. Beal: I might mention a very satisfactory case which I saw in the City Hospital. A young woman of about 30 entered the hospital with an indefinite mass in the right side in the region of the liver, and in that region there was an area of slight dullness about five inches in diameter and painless, with a history of gradual increase for several weeks. She was seen by a number of men on the staff and various diagnoses were made, and I was asked to cystoscope her. I catheterized and found the bladder and ureteral orifices normal, and I catheterized the ureter on that side and found the length of the tube about 14 inches and that the pelvis of the kidney held about 8 c. c., so I was of the opinion that this tumor was not connected with the kidney or the renal pelvis. An exploratory was done a few days later and absolutely nothing was found to account for the tumor. The liver was a little low, but it had a definite edge and the kidney was in the normal position and normal in size, while the colon was apparently normal and there was nothing found to account for that tumor and the dullness.

Dr. Smith: I think one thing impresses us all, that we should exhaust every possible resource for diagnosis in these cases. I think in the springing up of small hospitals throughout New England it too frequently happens that men make exploratories before these refinements of diagnosis are resorted to. I think the more we can impress upon men to exhaust all our resources for diagnosis before we explore, the better it would be. An exploratory operation is not always simple, and is not always followed by smooth recovery. I think we have all seen instances of infection following exploratory operations. But, after we have exhausted all resources, then it is our duty to operate before we see a large mass, as Dr. Chute has mentioned.

In cystic tumors of the kidney, in congenital cystic kidney, the lesions are almost always bilateral. We don't want to remove one, only to find the other in the same condition. Always go to the other side and explore before removing a cystic kidney.

Hypernephromata can hardly be said to be of particularly slow development. Some of them are slow and benign, and some are malignant and rapid. One I spoke of, a man who had such a tumor removed by Dr. Richardson, the pathologists reported it benign; there were no metastases.

The bismuth injection will not be popular in the ureter. We have had experiences with it in intestinal work and it frequently has remained along the intestinal tract for days and days before being expelled. The quantity of bismuth in the ureter will certainly be a serious matter—both mechanically and chemically.

I think the paper was very interesting and we should express our thanks to Dr. Garceau.

A CASE OF ACUTE METASTATIC GONORRHEAL MYOSITIS, WITH REMARKS ON THE DIAGNOSIS AND TREATMENT OF THIS AFFECTION.[1]

By CHALRES GREENE CUMSTON, M. D., Boston, Mass.

THE report of this case is given merely on account of the rarity of muscular complications of gonorrhea; rarity, I assume, because the most recent books on genito-urinary pathology, by Fuller, Leedham-Green and some French authors do not mention it, while Casper and White and Martin, in their Sixth Edition barely refer to it.

The history of the case is briefly as follows. In the middle of May, 1904, I was asked to see a young man, twenty-seven years of age, and obtained the following history: The patient, who had return from Europe the latter part of April, developed an acute gonorrhea on the steamer two days after leaving port. During the remaining five days occupied in the completion of the voyage, the patient treated himself merely by diet and rest, as he did not wish to consult the ship's surgeon, and, immediately upon his arrival, sought his physician, who found a well-developed acute gonorrhea. The treatment consisted in balsams and mild permanganate of potassium irrigations.

By May 7 the acute symptoms had subsided, the discharge had become whitish and the patient was feeling better, when, without any apparent cause, on May 10, the patient complained of a feeling of malaise and the temperature rose to 39.5° C. At the same time he experienced a sharp pain in the biceps of the right arm. This condition of affairs become more exasperated so that on May 15 I was asked to see the patient in consultation.

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[1] Read at the N. E. Urological Society, May 13, 1907.

Examination showed the biceps of the right arm somewhat tumefied and excrutiatingly tender on pressure. The skin was normal in color and the local temperature apparently not increased. Both the elbow and shoulder joints were perfectly free from any inflammatory process. A diagnosis of metastatic myositis was made. As to treatment, mercurial innunctions were ordered once daily, and the limb was enveloped in towels wrung out in hot water, and covered by rubber dam, to be changed as soon as cool, while internally ol. gaultheriæ gtts. X, three times a day was given.

To make a long story short, the patient slowly recovered under this treatment, so that by the end of June he had regained the use of his arm almost completely, although the muscle was still somewhat tender on pressure. The patient was seen again at the end of September of the same year, and recovery was found complete, there being no evidence of either muscular atrophy or of degeneration.

As far as I have been able to ascertain, metastatic muscular complications of gonorrhea appear to be relatively benign, while in the case of the other metastatic myositides, suppuration is very prone to occur, while in milder cases, various forms of muscular degeneration or atrophy appear to be the final outcome. In some rare cases[2] the general symptoms assume such seriousness, that death of the patient may result. In the gonorrheal form, general systemic disturbances are very moderate or may even be wanting, while the pain, although intense during the early stages of the affection, soon disappears completely, or nearly so.

The diagnosis of this affection should, I believe, be considered somewhat at length, because, as far as I am aware, it has been little discussed. In point of fact, there are many morbid manifestations which may deceive the clinician. In the first place, ordinary muscular rheumatism, with its attending pain and functional incapacity, is liable to come to one's mind. It is, however, quite probable that gonorrhea, which gives rise to articular pseudo-rheumatism, may also give rise to an infection of some muscle or group of muscles having a pseudo-rheumatismal appearance. The presence of a fresh urethral infection, or the lighting up of an old uncured gonorrhea will indicate the exact nature of the muscular manifestations.

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[2] *Vide* interesting case of acute purulent myositis reported by Dr. Squier, *Journal of the Am. Med. Association,* May 11, 1907.

In secondary syphilis, muscular pain and pain in the tendons is far from infrequent, and may be generalized and more or less persistent. In this case, one is dealing with a true syphilitic myalgia, the nature of which offers no doubt when the patient presents cutaneous or mucous manifestations of the disease, nocturnal headache and so forth, while, when these are not present, the action of a well directed specific treatment will settle the diagnosis in a large majority of cases. The question of diagnosis will only become a matter of some delicacy in those rare instances where the patient is afflicted simultaneously with both gonorrhea and syphilis.

The condition of the digestive functions should always be carefully looked into, as the case reported by Jullien and Sibut amply demonstrates, and is a very striking example of a truly typhoid condition that a patient may present in gonorrheal myositis. As time presses, I will not relate this case, but would refer those interested to the Transactions of the Urological Society of France, 1897, in which the case was published. In these cases the temperature and the abdominal symptoms must be carefully studied, but there are certain special procedures which will also remove all doubt.

In point of fact it is known that Widal's test will always give a negative result in the case of gonorrhea, while the palmar-plantar sign, which is frequently encountered in typhoid patients, has always been wanting in cases of severe gonorrheal infection that have been studied up to the present time. I might add that it would be interesting to ascertain whether or not Ehrlich's diazo-reaction is as constantly negative in gonorrhea as it has been found to be in syphilis.

In myositis of the recti abdominalis with a maximum point of pain over the appendix, accompanied by hardness of the muscle, the condition might lead one to favor a diagnosis of appendicitis. In some cases, an inflammatory process in the adnexa might be mistaken for a myositis of the abdominal muscles, but besides a bimanual palpation, which will give us the exact condition of affairs of the tubes and ovaries, one will never find in these cases the same violent muscular rigidity that is encountered in myositis.

An adenitis occurring during a gonorrhea might very well be mistaken for a focus of myositis, because, like the latter, it is met with in the form of a more or less large, indefinite, tumefaction and quite painful to pressure; but enlarged glands will always be present in their ordinary anatomical situation and will never be found in a muscle.

Arthritis and periarthritis are always accompanied by an enlargement of the joint; movements are impossible, at least temporarily so, while in myositis motion is hindered and even painful, but is always possible. And lastly, ankylosis and atrophy are probably never met with in myositis of the gonorrheal type, while in this type of arthritis they are not infrequent. In the gonorrheal form of myositis there is never any superficial edema or the hard and painful cord so characteristic of phlebitis. It is also by the limitation of the pain to a well defined course, generally quite long, which will prevent one from mistaking myositis with a neuritis, which also is made evident by special symptoms such as tingling and trophic disturbances.

And lastly, myositis of the deep muscles can very well be mistaken for an acute osteomylitis, but in the latter affection, one will find a more or less deep-seated painful swelling and a certain number of symptoms of a general character whose gravity far exceeds anything met with in gonorrheal myositis.

Although the diagnosis of gonorrheal myositis is sometimes more or less delicate, the same cannot be said of its treatment. In the first place, judging from the literature on the subject, it may be inferred that massage is to be absolutely proscribed. Camphor liniment and methyl salicylate do not appear to give any marked results, but tincture of iodine appears to have given some relief in certain cases. However, in the majority it has been without effect and consequently may, we think, be discarded. Sodium salicylate, antipyrine and potassium iodide taken by mouth, appear to have no action and have merely caused gastric disorders, while on the other hand, ol. gaultheria, taken several times a day at the dose of ten drops, appears to have some soothing, although not curative, effect.

I am inclined to believe that damp heat, in conjunction with inunctions of mercurial ointment, will shorten the cause of the affection more quickly than any other means we have at our disposal, and this line of treatment was certainly as efficacious as could be expected in the case here reported. It may be given either in the form of towels wrung out in hot water and covered with rubber dam, or by local baths given three or four times daily, the diseased member being retained in the water for an hour. It goes without saying that proper treatment should be directed against the urethral affection.

871 Beacon St.

THE OCCASIONAL FALLACIOUSNESS OF THE DIAGNOSIS OF ENLARGED PROSTATE MADE FROM DIGITAL EXAMINATION THROUGH THE RECTUM.[1]

By Granville Mac Gowan, M. D., Los Angeles, California.

TO those who have acquired considerable experience in the surgery of the prostate, it is very well known that the examination of this gland through the anterior wall of rectum rarely gives any accurate or dependable information as to the situation and size of the tumors which actually prevent the free passage of urine from the bladder, or create disturbances in the rythmical contraction of this viscus.

Given the symptoms of prostatism and the inference drawn from a rectal examination which reveals a tumor in the anatomical situation of the gland, is always that the condition is one for which an enlarged prostate is responsible. In nearly every case, the inference is correct. But there are exceptional instances in which the most experienced surgeons may be deceived.

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[1] Prepared for the meeting of the California Branch of the A. U. A., Monterey, April, 1907.

The three cases I report upon in this writing are of this character.

Case 1. J. T. B., fifty-two, married, farmer, a citizen of Temecula, came to me May 5, 1898, with total retention.

History: From childhood had an irritable bladder. At twenty he had a gonorrhea which was readily cured. Married at twenty-two, and has been a person of good habits ever since. About 1890, he noticed some lessening of the force of his urinary stream, and soon afterward had to rise at night to pass water. The power diminished and the nocturnal frequency increased, until in 1893, he was compelled to resort to the catheter to empty his bladder, and he had led a catheter life continuously until increasing irritability of the bladder, and the desire to be relieved of the tyranny of the catheter brought him to me.

Examination: The man was wan and haggard from pain and loss of sleep, but the examination of the organs of the chest cavity and abdomen, was negative. His kidneys were not enlarged or tender upon pressure. No obstruction in the urethra until the prostatic portion was reached. A soft rubber catheter would not pass into the bladder unless stiffened with a stylet and a silk Mercier required some force to enter. The bladder contained 180 cc. of very purulent ammoniacal urine. The bladder base was examined through the rectum before passing a catheter, and a marked bilateral, smooth enlargement of the prostate noted. After catheterization a bimanual examination disclosed a tumor in the position of the prostate.

Under an anesthetic he was sounded for stone with a negative result. The bladder was irrigated twice daily, until May 10, with a 1-30,000 solution of silver nitrate, when a prolonged and careful cystoscopic examination was made. At this examination a number of physicians assisted, and a demonstration of the bladder was made to a class of students, and the cystoscope was withdrawn and replaced several times.

The conditions found were those of a chronic cystitis. The image of the bladder neck showed a marked protrusion of the prostate into the field below, to each side, and above, but there were no distinct nodules projecting into the field. A diagnosis of retention from enlarged prostate was made, and on May 20, a perineal urethrotomy was performed preparatory to the removal of the gland. Upon enlarging the cut in the membranous urethra with a Blizzard, which I happen to prefer always to tearing or boring these tissues with the finger, there was a sudden gush of pus and débris. Upon following with my finger, it entered a hole in the anterior margin of the prostatic capsule which had been made by my knife cutting on the bottom of the urethra, and one by one I withdrew a large number of faceted phosphatic calculi, some of which easily crumbled.

Upon sweeping my finger around on both sides, I found there was nothing left of the prostate except an excessively thickened capsule, which had been so tightly spanned about the abscess cavity, that it had by pressure upon the stones contained within it, completely blocked the passage of urine and accurately simulated to the examining finger in the rectum and to the cystoscope an enlarged prostate. There evidently was some communication with the urethra for the stones were stained by methylene blue, which he had been taking for a month before he came to me. There was always more or less purulent discharge from the urethra, but this aroused no suspicion of a prostatic abscess, for there was no fluctuation to be detected in the prostate, and there had been no pain referable to this organ, and as the irritability of the bladder was so great that he had to pass a catheter every hour of the twenty-four, the mechanical irritation of the dirty catheter was sufficient to account for the presence of urethral pus. His physician had passed sounds for him, he had been in the habit of passing sounds himself at times to " loosen up," as he called it, the bladder so that the catheter would pass more readily. I sounded him for stone as also did my assistant, and we passed the cystoscope several times without ever anything occurring to make any of us suspect the presence of these stones which lay packed all around the prostatic urethra.

Case 2. B. W., thirty-seven years; laborer. Referred to me by Dr. Frank Bullard, January 24, 1904.

Complaining of great frequency and difficult urination for five months. He never had previously any serious illness. At twenty-seven and thirty-two, had light attacks of gonorrhea.

Examination: Testicles normal, no stricture, no enlargement of glands of groin. Bladder capacity 150 cc., residual urine 15 cc. Urine acid, specific gravity 1022, contains pus, a few red blood corpuscles, some albumen, but no casts, no tubercle bacilli, but streptococci, and colon bacilli.

By rectal examination, the bladder being empty, the prostate appeared very large and nodular; the middle and upper portions seemingly projected into the bladder. There was no enlargement of the lymph glands out along the sides of the pelvis, and no involvement of the seminal vesicles. It was noticed that the extreme limit of vesical distensibility was 150 cc., and that upon bimanual palpation, the bladder wall was thick; this was, however, attributed to a pericystitis; and as the patient was very anxious for the relief to be obtained from a vesical drainage, no cystoscopic examination was attempted. On February 2, I did a sectio alta upon him. As I neared the bladder, the character of the tissues told of malignancy. The whole superior wall was occupied by a thick and heavy epithelioma which filled the bladder space, rested upon the trigon, and felt then, as before operation, to the examining finger in the rectum, like a growth in the prostate, though the region of the trigone was not actively involved in the cancerous process, and the prostate was healthy.

Case 3. Mr. R. C. M., seventy years, November 2, 1906. Retired railroad officer.

For many years he has had some frequency and some difficulty in passing urine, due to a tight stricture of the phallic urethra at and near the meatus.

For five months he has had complete retention and led a catheter life.

Examination, dense stricture, 16 F., extending from the meatus to a point 2½ cm. posterior. Prostate feels through the rectum enlarged, but not clearly outlined, giving rise to suspicion of cancer of bladder base. Bladder capacity 900 cc.; urine cloudy and full of pus. The silk Mercier catheter used, gave, upon entering the bladder, the distinct sensation of pushing something aside. Urine acid, specific gravity 1020, cloudy and full of pus. On November 6, I cut the stricture and examined the interior of the bladder with a Kollmann cystoscope. The image of the bladder neck was very imperfect and many irregular projections could be observed about it. No definite image of the trigone could be observed and neither ureter could be seen. No satisfactory view of the superior bladder wall could be gotten.

November 8, Sectio Alta. Upon introducing my finger into the bladder, a space so enormous was encountered, that I thought I had broken into the perineal cavity, but in the anterior part of the floor I found an elliptical opening 4 cm. long by 2 cm. broad, into another chamber in which I could feel the sound passed through the urethra. This opening was enlarged, an assistant placed two fingers in the rectum, and on then exploring the lower vesical cavity and the posterior urethra, I found there was no enlargement of the prostate at all, either intravesical or intraurethral. I was dealing with a peculiar vesical deformity, the conditions of which had become exaggerated by the strain incident to the long existing obstruction of a tight stricture.

It was really an hour-glass bladder, the ureters running diagonally across the lower wall of the septum, ending in a trigone which had gradually hypertrophied until it sagged into the vesical outlet, producing total retention and simulating to the finger in the rectum prostatic enlargement to such a degree that in the presence of the other symptoms, deception was easy. The passage between the two chambers was anterior to the dip of this mass.

The operation for relief of the condition, consisted in removing a section of the septum 8 cm. long by 3½ wide, so as to provide for free drainage and approximately throw the two chambers into one. The trigone was then raised, the heavy intra-ureteral bar excised, the ureters dissected out and carried to the end of the raw surface left by the removal of the septum at its junction with the lower bladder wall, a distance probably 7 cm., and there securely anchored in a denuded space prepared for them. It was found necessary to resect a portion of the right ureter. The patient made an uneventful recovery. The abdominal wound leaked a very little for about ten weeks. He now passes from 180 to 240 cc. of urine every three to four hours, in a good stream, and does not have to rise at night. He passes the catheter once a day, and withdraws from 200 to 250 cc. of urine.

A cystoscopic examination was made at the time of writing this report, April 15, and a very good view of an unobstructed bladder neck obtained, the mouth of the right ureter may be seen in its new position a long ways off from the bladder neck. The urine may be seen coming from the left ureter, but the mouth itself not observed, for it is concealed by a sag in the bladder wall.

I suppose that other surgeons doing many bladder and prostatic operations might add to this experience. But whether they can or not do so, I want these cases to go on record as illustrations that in an apparent condition of prostatism, with an apparent tumor of the prostate to account for it, there sometimes is not really a real prostatism, and the tumor is not really prostatic, however much it may seem to be so from a carefully conducted rectal examination.

422 Merchants Trust Building.

THE TREATMENT OF INFECTIOUS PYELONEPHRITIDES.

By Dr. Henri Juy,

Ex-Interne of the Paris Hospitals, France.

(Concluded from June issue)

SECONDARY Interference. These are interesting to the surgeon to the highest point, because they remedy one of the most disagreeable consequences of nephrostomy, namely, reno-lumbar fistula. The occurrence of the latter is very frequent, the classical authorities placing it at about fifty-seven per cent. of all cases. Of the seven cases of nephrostomy that I have observed, four recovered without fistula, or other complications. In three, fistula resulted, for which complication resection of the tract was performed in one, while in the remaining two early secondary nephrectomy was resorted to.

These fistula were seated in the costo-iliac space, their length averaging from seven to eight centimeters, and terminated almost always in a purulent pocket. Their cause was due to continued subacute infection, sclerosis, a defective vitality of the perinephritic tissues, an dthe multiplicity of the diverticula.

More especially, however, is the condition of the ureter responsible for fistula, because stricture, bends, complete or incomplete obliteration prevent cicatrization of the tract on account of the purulent retention that they give rise to. The lesions of the excretory canal of the kidney are classical.

According to Gosset, in cases of pyonephrosis, which are nearly always of circulatory origin, the ureter presents lesions over a small extent, particularly at its upper part, a capital point when considering conservative surgery of the kidney. It is at the level of the renal segment of the ureter that obliteration usually takes place, the lower limit corresponding to the lower extremity of the gland. Beside this, one should always take into consideration the fact that the ureter opens into the pyelitic pocket. The canal never opens into the most declivous portion; there remains below and outwardly, a true cup-like cavity which contains a purulent residuum. This cup is in communication at its upper part with the ureter, the communication being represented by a narrow orifice presenting two true small valves formed by the mucosa. And still more the excretory canal and the gland are intimately adherent over a certain extent; there is the formation of a true spur, which Gosset compares to spurs formed by the mucosa in artificial anus. These pathologic notions are necessary to recall in order to render the understanding of the point to be gained by secondary interference.

The prevention of fistula has been obtained by a simple procedure. During nephrostomy an attempt is made to catheterize the ureter by way of the pyorenal pocket. This transrenal catheterization is not always an easy matter when one takes into consideration the anatomical conditions created by the septic pocket. When the catheter can be passed, it may be left temporarily without any inconvenience, the patients being able to retain it for a month. It is removed from the bladder by means of a lithotrite and tied to the pubic hair like any urethral catheter. The patients are thus allowed to walk about, and the temporary catheter straightens the bends in the ureter and maintains its permeability.

Unfortunately, the temporary ureteral catheter is not always sufficient, and in one case related by Albarran, the fistula did not heal at the end of three months in spite of cauterization, curettement, and so forth, so that it was necessary to perform secondary extirpation of the fistulous tract. In another case recorded by the same author, a secondary plastic operation had to be resorted to.

Tuffier also relates a case where the fistula remained for several years in spite of immediate permanent catheterization.

This prophylactic measure for the prevention of fistula is consequently often insufficient, the ureter being more or less contracted, although permeable, and its opening into the pocket being too high up, a purulent residuum remains in the latter.

I shall not insist on injections of tincture of iodine, zinc chloride, curettage, or cauterization of the tract. These means rarely bring about cicatrization, and it is necessary to have recourse to another interference. Now at what time should one interfere? It should be recalled that a certain number of these fistulae get well spontaneously, and in three of our cases they closed at the end of from two to three months; others closed at the end of two years, and for this reason it would seem that one should not be in haste to interfere.

When a secondary interference has been decided on, the pocket and the ureter should, in the first place, be explored, and in order to accomplish this, the long lumbar abdominal incision advocated by Albarran should be resorted to. It starts from the twelfth rib, which should be exposed, comes down vertically to within four fingers' breadth of the crest of the spinous apophyses to a point three fingers' breadth from the iliac crest, and is then brought forwards parallel to this crest to the level of the anterior superior iliac spine. It alone exposes the kidney and the lumbar portion of the ureter. The kidney is decorticated as well as possible, and is incised over the point of the fistula.

Several conditions may be met with. If the ureter is permeable to the catheter, if it enters quite low into the pelvis, a radical cure of fistula may be attempted. The ureteral catheter is introduced, the tract, its diverticula, the zone of sclerosis and the peri-nephritic inflammation which accompanies it are completely dissected out. The wound should then be completely closed. This radical cure was undertaken at the end of two years in one of our cases, and a cure was complete, the ureter being permeable.

In those instances where the ureter is not permeable, plastic operations may be resorted to. These interferences have been introduced by Kuster and Fenger, while Albarran has vulgarized them in France. The operative procedures of the latter have been described at length by Gosset and Gardner; they consist in a lateral anastomosis of the ureter to the pocket at its most declivous point. An opening to the extent of about twelve millimeters is made in the ureter, then retrograde catheterization, if possible, down to the bladder, is done and from below upwards to the pocket. The descending catheterization having been assured an opening is made in the renal pelvis at its most declivous point and where the wall is the thinnest. Then the technique of gastroenterostomy is used; suture of the posterior borders is done by four interrupted sutures. At this point in the operation, the temporary catheter is introduced, while the third step in the operation consists in suturing the anterior borders of the anastomosis with interrupted sutures. Many authorities have particularly insisted on drainage. The ureteral catheter (open end No. 10), should be inserted at least two cm. in the pyelorenal pocket and possess several lateral eyes. It should be fixed to the pubis below and above by a silk thread which should be brought out through the lumbar incision; free drainage should also be established through the lumbar wound in cases where the infectious process is marked. For the next days following the operation, several irrigations with sterilized water should be made through the urethral catheter. The lumbar drainage may be removed the eighth or the tenth day, according to circumstances, while the ureteral sound may be withdrawn about the eighteenth day. This technique has given excellent results, and Gosset mentions five cases of lateral anastomosis with four cures, only one being unsuccessful.

Kuster and Fenger have advised section of the ureter and transplantation. The ureter is cut transversely and then anastomosed to the most declivous portion of the pocket.

Section of the spur advised by Fenger, Bardenhauer and Albarran, can only be attempted when the ureter is very permeable. In order to do away with the incomplete retention kept up by the fistula, it has been proposed to resort to capitonnage of the lower portion of the pocket. But here again it is necessary that the ureter should be permeable at its upper part.

And, lastly, in order to remedy this condition of affairs, partial resection of the lower portion of the renal pocket has been advised in order to raise the level of the pocket. This operation should only be undertaken in certain cases, where, after section of the spur, or anastomosis of the ureter, a cul-de-sac still remains. In other words, a complementary resection is done, or, as Albarran terms it, orthopedic resection.

The results of these secondary plastic operations have been considered at length by Albarran in 1904, at the French Urological Congress. According to him, the failures are due to obliteration of the new opening, to movable kidney (the recent case reported by Hartmann), and to the persistency of a cul-de-sac below the level of the anastomosis opening.

The operation of choice, when the pelvic orifice of the ureter is healthy, is orthopedic resection of the kidney. When the ureter has undergone changes in its renal segment, lateral anastomosis is indicated. And last of all, the position of the kidney may be changed by nephrorraphy.

Secondary nephrectomy is indicated in several conditions. It is needless to say that it should be only undertaken when clinical examination and laboratory tests have proven the integrity of the opposite organ. It is indicated in those cases where, by ascending or transrenal catheterization, one is certain that the ureter is totally obliterated at several points and that it will never be possible for it to give a free exit to the urine.

Secondary nephrectomy was done in one of our cases where it was impossible to catheterize the ureter during the operation. After exploration of the ureter, it was found that this canal was completely destroyed throughout its entire upper segment, being surrounded by adhesions arising from the inflammatory process. This operation is also indicated in cases of prolonged local suppuration with a bad general condition of the patient. It is the treatment of choice in cases of multiple fistulæ, which resist all kinds of treatment, and little by little undermine the organism so that the patient finally becomes cachectic.

Treatment of pyelonephritis of pregnancy. Pregnancy acts on the feminine organism in such a fashion that it frequently gives rise to an insufficiency of certain glands, such as the liver, kidney, thyroid, etc. There is also a special predisposition, because the kidneys, during gestation, are overworked and obstetricians have described congestion of this organ. Besides this, the pregnant uterus acts mechanically and sets up incomplete retention by compressing the ureter in its pelvic portion. It is towards the fourth month that the uterus forms a large pelvic tumor, pushes the bladder up under the pubis and drags on the ureters.

Their partial obstruction is not due to the dragging exercised on them by the broad ligaments which, from the fact of the rising up of the uterus, undergo a sort of bending. I am more inclned to adopt Cathala's views, in that there is an entirely different mechanism. The bladder being pushed upwards and forwards, the ureters are pushed further away from each other outwards and downwards. These canals are dragged upon and become elongated, while their normal curve becomes exaggerated, so that hindrance to the passage of urine is slow and incomplete. According to the statistics published by Pollak, there was dilatation of the ureter in thirty-four per cent. of autopsies performed on pregnant women. Consequently hydronephrosis is not often met with, but the ureters are irregularly dilated and moniliform. There is dilatation of the renal pelvis and lesions of aseptic nephritis have been found in the kidney similar to those described after experimental aseptic ligature of the ureters.

However this may be, the part played by the uterus explains why the commencement of the pyelonephritis may occur from the fourth month on, and it also explains the benign evolution of this affection in pregnant women, because, in a large number of cases, after labor, natural drainage takes place by both ureters, which again assume their normal relationship, while infection of the upper urinary tract ceases.

But the evolution of this affection is still subordinated to certain special etiological factors. Before the period of commencement, pyelonephritis manifests itself by symptoms upon which Bar has insisted, and are those produced by the presence of the bacterium coli in the urine. This bacteruria is accompanied by the ordinary general phenomena, namely, a rise in temperature, rapid pulse and a serious general condition, but the principal condition to note is given by the urine which is passed in small quantity, deeply colored and cloudy, resembling sour broth. The fluid rapidly becomes changed. If examined at once after being voided, it will be found cloudy, and by shaking it, looks as if it contained a fine powder in suspension. This aspect, which is due to the bacteruria, has been compared to that met with in a broth culture.

If the urine is centrifuged an enormous number of motile bacteria and a few pus cells will be found. Bar insists on the frequency of digestive disturbances in pregnant women and considers this bacteruria as the infectious etiological factor. According to his way of thinking, the larger number of cases of pyelonephritis of pregnancy are due to infection by the colon bacillus by way of the blood. I have believed it necessary to insist on these particular modalities taken on by pyelitic infection during pregnancy, because they allow the study of the prognosis and the conduct of the surgeon relative to the mother and fetus.

Generally speaking, the prognosis of the pyelonephritis of pregnancy is benign, and the symptoms will disappear a few days after the labor. If labor occurs during the febrile period (the period of bacteruria of Bar), there is frequently a lowering of the temperature and a cessation of the general phenomena. If it occurs at the time when the pyelonephritis has become quietly installed, it only makes itself evident by pyuria, in which case the latter will progressively diminish and finally disappear. However, in certain cases it may persist and retention become established. Occasionally, the pyelonephritis reaches the chronic stage and undergoes an actue attack with each labor. In these cases, one is dealing with a pyelitis with secondary infection, which, instead of being recovered from after labor, gives rise to serious accidents, and may necessitate an imperative interference. However, Kendirvji has been able to collect sixty-two cases with only one death, the latter case being reported by Guyon, representing a pyonephrosis on one side and a hydronephrosis on the other. From the standpoint of the child the prognosis is not so good, because pyelonephritis may give rise to premature labor (19 cases out of 80 pregnancies, according to Cathala) and these premature infants are frequently weakly and die rapidly. Generally speaking, the age of the pregnancy is to be considered, and the nearer it is to term the more the child will be in condition to better resist and consequently the outlook is better when premature labor occurs.

What we have said regarding the evolution and prognosis of pyelonephritis of pregnancy in general, immediately indicates an easy therapy. Medical treatment is the one of choice, but I would again insist upon the necessity of making a precise diagnosis. In pregnant women, who have a rise of temperature, accompanied with digestive disturbances, the urine should be examined, while a cloudy urine, with or without symptoms of cystitis, should immediately draw one's attention to the kidney. In the pregnant woman, ureteral catheterization or endovesical separation of the urine are with difficulty done, or may be even impossible. For this reason the clinical symptoms must serve as a basis for the diagnosis, while the symptoms pointed out by Bazy will find their application and will give very marked results. Both ureters are easily felt by vaginal examination in pregnant women, they appear to the feel like thic kcords. The presence of a ureteral-vesical reflex, or an acute pain, when pressed upon, indicates the side involved, and also the bilaterality of the process. Pain produced along their track by abdominal palpation, also gives useful information. Cathala looked for the classical painful points in pregnant women, and he was always able to find the para-umbilical pain with great distinctness. In order to obtain this symptom, he advises pressing the abdominal walls at a little more than three fingers' breadth external to the linea alba and to push the finger behind the enlarged uterus. The subcostal pain is not found with such ease.

It is unnecessary to recall the principles of medical treatment, because these have been discussed in the former part of this paper. However, in the pregnant woman, rest and milk diet are not only to be insisted upon, but to these purgatives and intestinal antiseptics should be administered. When this preventive treatment is applied, pregnancy undergoes its evolution without incident.

Expectation should be the rule, but the gravity of the general phenomena, or the virulence of the infection, have been the indication for producing abortion or premature labor. Abortion was induced by Potocki, premature labor three times by Bar, twice by Lepage, and once by Vinay. In other cases, surgical intervention was required.

Nephrostomy has been undertaken in instances of pyelonephritis of pregnancy, but especially in those cases where the evolution was not stopped after emptying the uterus (Guyon, Albarran, Cumston and others).

Nephrostomy has also been done during pregnancy or after labor, but it is difficult to judge of the comparative value of these interferences, but we would, however, again say that they must be exceptional.

Induced labor appears to me to present very numerous objections; from the child's point of view the prognosis is bad, and, if it is undertaken during the first months of pregnancy, we merely have an abortion; while if the pregnancy is near term, it is probable that the child will be weakly. From the mother's standpoint, there is danger of transmission of the urinary infection to the genital tract, but we would, however, second the remarks made by Kendirdji in his excellent article, which appeared in 1904, in the Gazette des Hôpitaux. "All things being equal in cases of pyelonephritis when the interference on the uterus should be undertaken for the fetus, and that the chances of the latter are reduced to the minimum; in other terms, when the pregnancy is far from term, preference should be given to surgical interference and not sacrifice the child deliberately. On the contrary, if the case is near term and the chance of survival of the child is very great, there is no longer any doubt, and labor should be induced. This same practice should be resorted to in bilateral lesions, but only when renal depuration is absolutely insufficient, because urinary insufficiency may bring about the spontaneous expulsion of the fetus."

"Nephrostomy may be indicated during the early months of pregnancy in case of pyonephrosis. It has been performed during the fifth month by Cumston and Hefeinber, without any amelioration, so that they were obliged to perform secondary nephrectomy. In both these cases nephrostomy was absolutely useless on account of the bilaterality of the lesions in the first case and abortion in the second. Consequently, it should only be resorted to exceptionally during pregnancy. The same cannot be said after labor. When pyelonephritis persists in spite of the emptying of the uterus, or when there is retention, one should apply the same principles as in cases of ordinary pyelonephritis."

I cannot end this study of the treatment of pyelonephritis of pregnancy, without saying a few words as to the conduct to follow at the time of labor and during the postpartum. Both during and after labor, every precaution of asepsis should be taken in order to avoid infection of the genital tract, and this special care should be continued for a number of weeks afterwards. Wallich has recorded two cases in which the catheter was passed regularly in order to prevent the urine from coming in contact with the vulva and genital organs.

CONCLUSIONS

Simple infectious pyelonephritides can usually be cured by sufficiently prolonged medical treatment. It is consequently necessary to look for the symptoms in order to make as early a diagnosis as possible.

It is by a systematic examination of the ureter in its abdominal course as well as in its passage through the pelvis, that pyelorenal infections are to be detected. The painful points (subcostal, paraumbilical), the sensation of a large and painful ureter ascertained by vaginal examination, painful spots on the prostatic cornuae, uretero-vesical and pyelo-vesical reflexes, associated with pyuria and nocturnal pollakiuria, form a clinical complex described by Bazy, which will allow one to make sure of the existence of a pyelonephritis.

Medical treatment includes hygenic measures and diet. As long as pus cells are present in the urine, the patient should be kept in bed on an absolute milk diet. Balsams may be useful, but, at the present time, there is a tendency towards the use of internal antiseptics; salol and especially urotropin and helmithol have given really remarkable results. And lastly, in certain cases, the medical treatment is to be completed by hydrologic medication.

The amelioration and cure of simple pyelonephritides are announced by the disappearance of the painful points along the ureter, the cessation of the nocturnal pollakiuria and pyuria.

In the pyelonephritides with distension, the indication for operation is, above all, furnished by changes in the general health, the persistency of the pyuria and the increase and size of the kidney.

All surgical interference in cases of septic retention should be preceded by an examination as to the functional value of both kidneys. In the first place it is useful to study the total urinary depuration by the classical procedures, such as histological and chemical examination, cystoscopy, etc. These procedures are afterwards applied to the study of the urine coming from each kidney, collected either by ureteral catheterization or segregation.

Nephrostomy is the operation of choice in septic pyelorenal retentions.

Lumbar fistulæ, which persist, being kept up by an incomplete retention, should be treated by secondary interferences; lateral anastomosis of the ureter to the renal pelvis, resection and transplantation of the ureter, or orthopedic resection of the kidney, will result in a cure.

From the progress accomplished in conservative surgery of the kidney, secondary nephrectomy presents very limited indications.

The pyelonephritis of pregnancy, on account of its particular evolution, should be treated medically, and surgical interference of the kidneys is only indicated after removal of the fetus. Labor should be induced only in rare exceptions.

EDITORIALS

TORSION OF THE SPERMATIC CORD.

TORSION of the spermatic cord only arises in cases where the migration of the testicle is incomplete and an organ in ectopia alone may twist its pedicle. Under these circumstances, it sets up symptoms of strangulation, closely simulating intestinal obstruction.

Torsion of the spermatic cord frequently appears to be the consequence of a direct traumatism, but this peculiarity is not constant and spermatic strangulation may arise without any appreciable cause. It has been met with exceptionally when no ectopia of the testicle was present.

The pathogenic causes of torsion of the cord are matters of much discussion; Sébileau supposed that torsion was only possible if, at the same time, a rotation of the vagino-parietal envelope occurred, or a rotation of the meso of the testicle when sufficiently elongated. The lower meso is often the cause of this accident, only this meso does not always exist, the testicle is free, so that torsion of the spermatic cord would appear to be easily produced.

The lesions demonstrated at operation are characterized by a marked congestion of the seminal gland. The vaginal tunic contains a small amount of serous hemorrhagic fluid; the cord is tumefied and presents a torsion on its axis of 360 degrees in the same sense as the hands of a watch. The veins are swollen above the point of torsion, while the cord is dark red and edematous. In the testicle interstitial hemorrhages, infarcts and thromboses of the smaller veins are met with.

Torsion of the spermatic cord occurs more especially in young children and is less often met with in adolescents. It commences suddenly following an effort or a traumatism, but it may occasionally arise apparently spontaneously during sleep. Usually one is dealing with a child presenting an ectopia of the testicle, which is still seated in the inguinal canal, but in other cases the seminal gland is in the scrotum, although incomplete in its descent.

A severe pain opens the drama, seated in the inguinal region and frequently accompanied by vomiting and, in the beginning, a very persistent constipation may be present. Examination reveals a painful tumefaction in the inguinal region extending down into the scrotum. The swelling is tense, renitent, dull on percussion, and irreducible. The testicle is not in the scrotum. One is apt to suspect a strangulated interstitial hernia, that is to say, an inguinal hernia which has arisen behind a testicle in ectopia. At other times, on account of the high position of the tumefaction, torsion may be mistaken for an appendicular abscess and, in point of fact, the swelling soon takes on the aspect of a deep-seated abscess.

If a surgical interference is not undertaken to relieve the funicular torsion, the testicle may undergo progressive atrophy; more frequently necrosis arises, the peripheral tissues undergo a supperative process and soon a fistula makes its appearance through which the gland becomes eliminated little by little. In other cases the evolution of the process does not present this extreme gravity, because a spontaneous reduction of the torsion may occur, but this is only met with when the twist is incomplete. Under these circumstances a complete recovery will take place without surgical interference.

The diagnosis of torsion of the cord is a matter of extreme difficulty in many cases. One usually thinks of a strangulated inguinal hernia with a tendency to intestinal necrosis and it is only during the operation that the true condition of affairs is revealed. At other times an orchitis arising in a testicle in ectopia is the diagnosis, but there are no distinctive signs which will allow one to differentiate the two affections, and it has been asserted by Vanverts that a testicle, whose cord is strangulated, becomes easily inflamed and gives rise to lesions of inflammatory orchitis. The causal traumatism may also be the means of leading one into an erroneous diagnosis which may be that of a deep-seated hematoma. But, from the very beginning of the trouble, the symptoms of internal strangulation are very prominent, and show the necessity for an immediate operation; in other words, in many cases the diagnosis is subordinated to the surgical intervention.

The prognosis of this form of strangulation is serious, unless treated surgically, because the consequences of torsion of the cord means the loss of the testicle. Spontaneous untwisting is the most favorable outcome, but, in order that the testicle be free from any lesion, this occurrence should take place early in the process, during the first few hours, otherwise the parenchyma of the gland becomes hyperemic, then degenerates and finally undergoes atrophy.

If reduction of the torsion does not arise during the first few hours surgical operation is absolutely necessary, and one should not wait too long in hope of a spontaneous cure, because the testicle will rapidly undergo disintegration; one should interfere before any invasion to the surrounding regions of the necrotic process has taken place.

The nature of the operation is a question to which much thought must be given, and whether or not a child should be submitted to castration for torsion of the cord is a matter of much conjecture. According to modern surgery, however, it is hardly to be discussed, given the advanced state of the testicular lesions met with in all similar cases, the facility of the recurrence of trouble and the impossibility to solidly fix the testicle, no hesitation is permissible and the gland should be removed after reduction of the torsion of the pedicle. To allow a testicle to remain after reduction of the torsion simply means the continued possession of a diseased organ which will be useless in the future and exposes the subject to further attacks of strangulation at no distant date.

THE DIAGNOSIS OF TUBERCULOSIS OF THE PROSTATE

IN the vast majority of cases, tuberculosis of the prostate develops in subjects already the possessors of a chronic inflammatory process in the gland, and very frequently it is most difficult to make a differential diagnosis between chronic prostatitis and tuberculous prostatitis in its early stages. The latter type presents itself in various forms, but we think that we may, with a certain amount of accuracy, reduce them to two principal types, according to whether the lesions predominate near the urethral mucosa or in the parenchyma of the gland.

In the first type we have as functional symptoms all those that are ordinarily met with in chronic posterior urethritis. In the early stage of the process these are slightly marked, but they become accentuated very rapidly and are in no way proportionate to the minute lesions present. Disturbances in micturition are the first to appear, the patient complaining of an imperious desire to urinate, this desire becoming frequent and often terminating in a pseudo-incontinence. At first sight one might be led to suspect an extension of the process to the bladder, but in this respect this symptom is far from certain because it is met with when the bladder is free from any involvment. The evacuation of the bladder becomes slow, the stream is retarded, while the patient complains of feeling of incomplete micturition and suffers from tenesmus.

Not infrequently one meets with a partial retention, and later on, when the infiltration has involved the vesical sphincter, the latter becomes paretic, the urine escaping drop by drop, and thus a true incontinence becomes established.

Hematuria is met with in all stages of the process. It usually appears early and may be rightly compared to the premonitory hemoptysis of pulmonary tuberculosis. When this is the case it is not due to an ulcerative process, but occurs merely from congestion. The blood, like the pus, is brought out either with the first few drops of urine, but more usually it appears at the end of micturition. The urethral discharge is very similar to that met with in gonorrhea, but inflammatory phenomena are absent, the prostatic urethral mucosa being alone pathologically changed. Microscopical examination frequently reveals the presence of the specific bacillus.

Beside being ordinarily difficult on account of the spasm of the membranous urethra, catheterization is frequently very painful and gives little enlightenment. Endoscopic examination is of no avail and should be proscribed. Rectal examination is of little value, especially in the commencement of the process. The gland may not necessarily be increased in size, while its surface will be found still smooth and its consistency normal. However, pressure on the gland will give exit to prostatic fluid mixed with pus in which Koch's bacillus may be found. In the more advanced stages the lesions are no longer limited to the neighborhood of the urethra and tuberculous foci develop so that they may be felt with the exploring finger.

In the parenchymatous type, the process being limited to the central portion of the prostatic parenchyma, no symptom is present. When the affection develops in the peripheral layers near the rectum, the symptoms are simply a certain feeling of weight in the perineum and a malaise when the patient goes to stool. However, pain finally becomes manifest when the patient sits for some time, and may also be set up by the jolting of a carriage or walking. It is quite independent of micturition, whose disturbances are only slightly marked at the commencement of the process.

The first part of the stream of urine brings down the purulent deposit which has accumulated in the prostatic urethra when suppuration is sufficiently marked. The urine voided in the middle of the act is always clear, while the presence of pus at the end of micturition is symptomatic of cystitis. Nevertheless, when the glands are gorged with pus, the contraction of the periprostatic muscles may cause it to appear at the end of micturition. Chronic constipation is a frequent accompaniment of tuberculous prostatitis.

The discharge in the parenchymatous form is made evident by a purulent discharge during defecation, or after gentle massage of the prostate. When it is due to the opening of small tuberculous abscesses into the urethra, the discharge occurs during the interval of micturition, while in the advanced stages of the process, it is, on the contrary, continuous. One must not estimate the extent of the focus by the quantity of pus discharged, because old cavities with thickened walls give rise to little secretion, while a young focus undergoing disorganization, gives rise to an abundant suppuration.

Rectal examination is valuable in these cases, because it shows the great tenderness of the gland, and this sharp pain on pressure is an early and useful symptom in making a diagnosis. The prostate is increased in size, but rarely uniformly so. Usually one of the lobes is larger than the other. Over the surface more or less projecting nodules may be felt, while in those instances where the tuberculomata are very superficial, one may feel little projections similar to shot.

The tuberculous production has a tendency to become isolated and as long as it does not suppurate, the examining finger may nearly always map out its contours. The tumefaction of the gland is rarely very large, but when it has increased to twice its size or so, it usually contains one or several purulent foci. Fluctuation is rarely manifest, because the wall of the abscess rapidly ulcerates, resulting in a cavity with irregular walls. The vesicles are involved at the same time, usually before the process in the prostate, while their tenderness and the presence of nodules in them indicates their participation in the process.

The welfare of the patient entirely depends upon an early diagnosis, and when this can be done, there is a fair amount of chance that certain therapeutic measures may cure, or at least considerably alleviate the patient.

BOOK REVIEWS

Surgery of the Genito-Urinary Organs. By J. W. S., GOULEY, M. D., New York, Rebman Co., Publishers.

Although no date of publication appears on the front page or after the preface, we assume that this very excellent little volume has appeared in 1907.

Dedicated to the memory of the renowned Dr. Mercier of Paris, this book is made up of short annotations on the nature, diagnosis, and treatment of certain diseases of the urogenital apparatus. The purposes of the book are eminently practical and it is particularly adapted for beginners in this field of work. Dr. Gouley's long experience in this important branch of surgery has enabled him to place before the profession sound principles and judgment in the diagnosis and treatment of urologic affections. We are glad to find no illustrations, a feature of book-making which to-day we believe to be greatly over-done. The text is easy reading and the book can be thoroughly recommended.

CLINICAL LECTURES ON ENLARGEMENT OF THE PROSTATE.

By P. J. FREYER, M. D., New York, 1907. Wm. Wood & Co., Publishers.

Under the above title Dr. Freyer discusses the general subject of prostatic enlargement and its treatment. The space devoted (154 pages) is quite insufficient for a careful consideration of a theme of this magnitude, and the only part adequately treated is the operative results of suprapubic prostatectomy.

In chapter 1, he considers the "Nature, Pathology, Symptoms, and Diagnosis" in such a sketchy and incomplete way as to be valuable only to the novice. With his conclusion that no sound explanation of the cause of prostatic enlargement has yet been given many will agree.

In considering the diagnosis he advises what would seem to be rather a reckless use of instruments without the preliminary administration of any urinary antiseptic,—a method which might be expected to result in some bladder infections.

In the chapter on "General Treatment" the attempt to cover the whole ground in a few pages has led to a dogmatism of statement which is, at times, misleading. Thus the dictum "that gum-elastic instruments cannot be boiled without injury" should not be literally accepted. The reliance which he places on soap and water as a disinfectant for catheters is hardly safe teaching for the beginner to whom these chapters appear to be addressed. He says, "Fortunately in soap and water we have an efficient, convenient, and practical method of cleansing catheters, and this is what most patients have to rely on and that with impunity." This is doubtful sound teaching.

Again it may be suggested that "castor oil" is a most irritating lubricant for catheters.

Having thus superficially gone over the field, he devotes the remainder of the book to what he is pleased to style "My Operation." All other methods are dismissed as having enjoyed "temporary though transient notoriety." He discusses in great detail the development and technique of his method and details case after case in support of his contention. The gist of the argument is that the whole prostate with its capsule and most of the prostatic urethra can be removed without great difficulty or undue risk. His statistics on this point are convincing.

The after treatment of his cases seems a bit crude. No attempt is made to drain off the urine from the suprapubic tube and it is allowed to soak into the dressing and keep the patient constantly and unnecessarily uncomfortable. This, perhaps, accounts for his dogmatic and inaccurate statement about buried sutures. "On no acount should buried sutures be employed as they are certain to be infected by the urine,"—a certainty which could be removed by the better management of drainage.

In chapter 5 he treats of the scope and limitation of the operation. He does not think operation advisible in patients with small prostates and a residual óf not over two ounces, "Because the enlargement of the organ will not have sufficiently advanced to render it prominent in the bladder or to define adequately the lines of cleavage."

A great majority of the cases which he presents are patients with what we should consider large prostates and therefore readily amenable to treatment by any operation. The dependance of his method upon this degree of enlargement is shown by the following quotation in which he refers to the treatment of so-called small prostates. "These are the cases I presume that are commonly spoken of as being instances of 'fibroid' prostate. They are capable of being removed entire if well defined or projecting into the bladder, but one cannot assure the patient beforehand of a perfect result as in ordinary adenomatous enlargement of the prostate of advanced age, for in some of these cases the bladder never regains the power of completely emptying its contents naturally, there being a certain quantity of residual urine left behind. Fortunately such cases are rare."

Were Dr. Freyer somewhat better acquainted with the work of other operators he would realize that many surgeons have reported good results in just such cases after a perineal operation.

In chapter 7 he sums up his results and denounces all interlopers. His showing of 312 cases with 22 deaths is most creditable, and as far as we know the largest single collection of cases yet reported. His work has helped to place suprapubic operation on a firmer basis and he is entitled to much credit. Dr. Freyer, however, seems to be lacking in scientific and judicial spirit and to be ignorant of what will be held to constitute proof. Thus he asserts that "The patient can be assured beforehand that if he is prepared to accept a comparatively small risk attached thereto, he can with absolute certainty look forward to a complete cure." After such a statement it is interesting to note that his conclusions appear to be based almost wholly upon letters from patients, and among all the cases which he quotes, in only one is evidence presented to show that the presence or absence of residual urine has been tested with the catheter. The notable unreliability of reports from patients should make him more cautious in accepting their statements without qualification. His sublime egotism is nowhere better shown than in the following paragraph: "I submit that the results of this operation—so subversive of all preconceived ideas regarding the enlarged prostate, so revolutionary in its effects, so complete and permanent in its cure—are truly remarkable. They are far beyond anything I could have hoped for at its inception. I believe that I shall not be accused of exaggeration when I state that all previous so-called methods of radical cure of enlarged prostate were truly unsatisfactory and that catheterism, though hitherto the least objectionable mode of treatment in the majority of cases, is certain sooner or later to terminate in cystitis and other dangerous complications. The successful results obtained in this large series of cases of total enucleation of the enlarged prostate encourages us to hope that we have at last arrived at a rational and practical method of dealing with one of the most painful, pathetic, and fatal diseases."

The last six pages of the book are given over to a denunciation of Dr. Fuller and others who have questioned the magnitude of his genius. Though all discussions of priority are unpleasant and likely to end in disagreement, we cannot pass over this one without comment. No unprejudiced observer who will refer to Dr. Fuller's article in 1895 or his book in 1900, will have any doubt whatever that he distinctly advised and practiced "total suprapubic prostatectomy." Dr. Freyer confuses assertion and reiteration with argument and proof, and the result is undignified and unconvincing. It is much to be regretted that a man who has done such really good work should thus belittle himself.

Hugh Cabot.

Note.—The first procedure of note was that of Belfield of Chicago, and McGill, of Leeds. They did *partial* prostatectomy through a suprapubic incision. Belfield had thus operated three times before the Leeds surgeon had done his first case. Then in 1895 Fuller, of New York, did a *complete suprapubic enucleation* of the prostate. A similar enucleation was done by Watson, of Boston, in 1897, and it was not until 1900 that Freyer adopted and modified the principle of Fuller's method.—Editor.

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THE DAWN AND DEVELOPMENT OF UROLOGY[1]

By BRANSFORD LEWIS, M. D., St. Louis, Mo.

WHILE urology has, for years back, numbered among its exponents men of individual brilliancy and bold originality, there has been until comparatively recently, no systematized development of this as a well-defined or accredited department of the healing art, but it has rather been absorbed and diffused into the older subjects of general surgery and the practice of medicine. Even what individuality it may have possessed was not always of a desirable sort. It was often made to bear the obliquy of associations and associates far from respectable. Certain so-called " specialists " attached to its ranks were habitually dubbed by names more forcible than elegant.

It is on that account, as well as for their preëminent scientific ability, that a great meed of praise is due the Fathers of Urology in the days gone by. They were not abashed by these uninviting conditions; and, pioneer-like, they fought their way through the untrodden and often discredited paths of urology. Although their deductions may not always have been logical nor their teachings correct, they blazed a trail to the lasting advantage of those who followed in the same quest.

They had no such conditions for their encouragement and assistance as we have now. They had no such instrumental equipment as is within our reach at the present day; and no such clean-cut technique for its use, all formulated and served to us by our generous confrères. Diagnosis and therapy of urinary affections were not then reduced to the satisfactory degree of precision and accuracy now prevailing. Yet they investigated and practiced and wrote and enunciated precepts that challenge our unstinted admiration for their wisdom and intelligence.

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[1] Presidential address delivered to the American Urological Association, at its sixth annual meeting, Atlantic City, June 3-4, 1907.

Of the old countries, England, France, and Germany have been most prolific in producing ardent students and practitioners of urology.

Who of our student-family but is familiar with the great work of Henry Thompson, later dubbed a Sir Knight, in recognition of his eminence in his chosen work? Who but has followed his well-marshaled arguments and logical deductions on the diseases of the urinary organs; his tremendous labor relating to vesical calculus, accomplished at a time when to "cut for stone" was a matter of no inconsiderable moment; the extent of which is evidenced in the collection of over a thousand urinary calculi and foreign bodies now in the keeping of the Royal College of Surgeons in London?

We must not fail to appreciate, too, the helping hand this same patriarch of urology gave to the dawn of reason in prostatic therapy; to the transition from helpless and hopeless incompetency to the present condition of masterly ability in that line; in which, by judicious and well-executed surgical measures, the days of torment and the nights of ceaseless vigil of the aged sufferer are replaced by peace and repose; in which the hunted look gives way to the smile of content not easily erased, in testimony of his reclamation to the well-earned enjoyment of his declining days, rather than a never-ending vibration between bed and closet in futile endeavor to obtain relief.

Sir Henry Thompson rendered a further valuable service by formulating an intelligent plan of investigation of genito-urinary cases, teaching that questions and physical examination should follow certain prescribed plans, which he outlined and adhered to. Such methodic plans, amplified and made to comport with modern armamentarium and technique, are now made use of by every conscientious practitioner of this line of work. They form a part of the advanced work of to-day, eliminating the haphazard of diagnostic research and promoting thoroughness, completeness and certainty of results.

The British Empire has been generous in contributing leaders in urological work. David Newman, of Glasgow, is renowned for his studious and authoritative contributions on renal surgery; and he has had worthy company in such men as Knowsley Thornton and Henry Morris, whose writings are familiar to all who study the surgery of the kidneys. In the same category is Reginald Harrison, who insisted on the necessity of external, in connection with internal urethrotomy, from the standpoint of safety with respect to sepsis, hemorrhage, and reliability; whose studies in the etiology of prostatic hypertrophy have gone at least as far as those of others in solving this mooted question:. That is, they leave it still "*sub judice.*" Harrison was early an advocate of surgical interference in renal congestion and inflammation, reporting the good effects of nephrotomy in connection with those conditions. He has been a devoted scholar of urology, and his name will ever shine in the history of this branch of science.

Inseparably connected with the work of our own countryman, Belfield, is the name of McGill, of Leeds, England, in the subject of prostatectomy, since these two gentlemen were contemporary in the development and advocacy of supra-pubic removal of the prostate for obstructive hypertrophy, in 1885. The value of the encouragement given this work by these gentlemen can hardly be overestimated.

One cannot leave off mentioning the shining urological lights of England, without a desire to place one of her most illustrious examples, Hurry Fenwick, in the position to which his diligence and originality entitle him. He has been illuminating, as well as elevating, the stage of cystoscopy in England by his many years' work in that line and by the extremely valuable lessons to which his observations have led.

In addition to these, of the more recent period, England has given other urologists whose name and fame are familiar to all acquainted with medical history; such as, Sir Benjamin Bell, whose animated discussions with John Hunter on the subject of the relationship of gonorrhea and syphilis form interesting pages of the eighteenth century's history. Dickenson illumined the subject of nephritis in a masterly manner; and the charming literary style of Fothergill made his writings on diseases of the kidneys as fascinating as a novel.

France began early to contribute favorite sons to urological work. From 1830 to 1860, Civiale wrote instructive essays, embracing the history and practice of lithotrity, and the various means for treating calculus; urethrotomy for stricture; and finally, presented, in 1858, his Traité Pratique des Maladies des Oranges Génito-Urinaires, in three volumes, which discussed a wide range of urological subjects, quotations from which are to be found in all modern writings. While in London some years ago, I was fortunate enough to find in one of the old second-hand book stores of the Strand, a set of these volumes, that, as indicated by the signed inscription of the author, had been presented by Civiale to Curling, the English author of a valued treatise on Diseases of the Testicles, 1848.

As Paris is to France, so is Felix Guyon to French urology. He "is the State," in that respect. His charming lectures and writings have lured many of us to pursue the devious channels of the French language if for no other purpose than to cull their enjoyment at first hand without the dilution of translation.

The urological clinic organized and conducted under the auspices of Professor Guyon, at l'Hôpital Necker, in Paris, is an evidence of the masterly ability of its distinguished patron—one is almost tempted to say, patron-saint—and is probably not surpassed by any similar clinic extant.

His work is not confined to his own personal efforts. Under his inspiration his corps of assistants carry out the details of experimental or original work assigned to them, with the result of manifolding many times the genius of the distinguished savant, and enlarging his usefulness accordingly.

Other French names of distinction in urology are, Albarran, Boisseau du Rocher, Pousson, Janet, Segond, Desnos, Hallé, Jamin, and Delefosse; the last named especially for conducting what may be conceived as the best urological journal in circulation; the former for their assiduous devotion to the work embraced under this term.

If we view with admiration the accomplishments in urology in the Fatherland, including Austria, by such of their illustrious sons as Ultzmann, who studied and elucidated the subject of neuroses of the urinary organs; Dittel, who wrote and operated well on surgical affections of the genito-urinary organs; Guenfeld, who so materially advanced the position of urethroscopy; Oberlaender, who promoted urethral pathology and therapy, and has made valuable contributions to our literature; Casper, who in addition to his cystoscopic work has studied the functionating power of the kidneys in relation to contemplated surgical measures; Gustav Simon, who first performed nephrectomy; Hahn, who demonstrated the feasibility and value of nephrorrhaphy; Israel and his formidable array of renal operations, recounted in his elaborate treatise on that subject; Freudenberg, who popularized the Bottini operation; von Zeissl, Kollmann, Finger, Wossidlo, Frank, and Lewin; if we admire the accomplishments of these and many others that might be mentioned, how shall I adequately express the esteem in which the father of modern cystoscopy, Max Nitze, is held? The one who did more than any other to pave the way to precision in urological diagnosis and therapy as they exist to-day? If there has been one reason to explain the substantial progress along broad and scientific lines that has been made by this department of medicine in late years, the cystoscope is that reason. It has transferred the study of urinary diseases from an inexact, intangible, shifting basis to one of definite and established proportions. Together with ureter catheterization, the cystoscope has been the means of bringing within definite diagnostic reach all of the upper urinary tract—the bladder, the ureters and kidneys. Through this instrument, the world is ours, now, for the taking. A world of diseases and disorders is now placed lucidly before us—conditions that have hitherto been inaccessible and remote, or even unrecognizable. This field has heretofore been noted as one of speculation and argumentation, a diagnostic shuttle cock, dancing from point to point in accordance with the strength or weakness of theoretical contention. It was the mind of Nitze that materialized to practical use the idea of direct inspection of the bladder; his hand guided the growth of this wonderful instrument from its infancy to its maturity; from the cumbersome and dimly-lighted mechanism of the early days to the graceful and effective instrument of the twentieth century; and, fortunately, he lived to see the fruition of his hopes, the world-wide recognition of his instrument, as a blessing to humanity, and its use in all civilized countries.

If I have reserved the mention of urologists of our own country for the last, it is not because they are less esteemed than those of the older countries, or that their achievements have been less valued. On the contrary, one can hardly restrain his justifiable enthusiasm when he thinks of the record made in urology by his compatriots in the short period in which his country's history is condensed.

Beginning with the luminaries of former days, of those standing out most prominently, may at once be recognized the name of Bigelow, of Boston, whose forcible writings and effective instruments compelled acknowledgement of the value and position of lithotrity for vesical calculus; and Fessenden Otis, who was both original and radical; whose bold declarations were maintained with a vigor that compelled conviction; and it was only the sober second thought of his urological pupils that kept them from following him like the children followed the Pied Piper of Hamlin. Notwithstanding the radical nature of the elder Otis's teachings, and the fact that they were subjected to much pruning and mollifying by his followers, his mission was well fulfilled in awakening the medical world to higher ambitions with respect to the relief of urethral stricture and other urinary affections. His mechanical genius was preëminent and served to maintain the reputation for mechanical ingenuity perennially held by the Yankee. Happily, it was inherited and even amplified by the younger Oits, one of our revered and bereaved members and also the initial Vice-President of this association.

Van Buren ably lent his stamp to the urological literature of this country; and after his work was done, transferred the burden and the honor of his duties to the younger but equally stable shoulders of Edward L. Keyes, who has for years been in the fore-front of contention for progress that is well grounded, that is scientific, and worthy of being termed such. The contributions of this author have long been standard in American urological literature.

In venereology, Bumstead and Taylor held a commendable position. Goulay and his contributions to urethral surgery, both literary and in the form of valuable urethral instruments, must not be overlooked. Nor must we fail to acknowledge our debt to the scientific work of L. Bolton Bangs, who has taught us both the surgery and disorders of the genito-urinary system.

In former times, the West and South have had able and worthy representation in such men as Bryson of St. Louis; Chismore, of San Francisco; Charles Briggs, of Nashville; James Dunn, of Minneapolis; Christian Fenger, of Chicago; Hunter McGuire, of Richmond; Ed. Palmer, of Louisville;—whatever may be said of the representation of these parts of the country at the present time.

However, when we recall the names and associated accomplishments of Wishard, Belfield, Byron Robinson, Lydston, Goodfellow, Senn, Schmidt, Elliot, MacGowan, Kreissl, Rilus Eastman, Kolisher, Glenn, Whiteside, and a host of other present-day laborers in this field, it may be conceded as true that these portions of the country are not altogether lacking in some worthy representation by the living.

Contemporaneous with them and, no doubt, often in competition with them are the wise men of the East of the present time, who, while laboring in the field of urology to the lasting benefit of their profession, have been winning renown for themselves and a vast deal of credit for their country. Time and space are too limited for me here to mention all of their names or recount their glorious deeds. Besides, it is presumed that they are present and can arise and speak for themselves.

Suffice to say, that their names, though legion, are as familiar as household words to us out West; that their work is watched with the same interest, solicitous but not jealous, that is besowed on the efforts of one member of a family by the others, and our delight in their success and attainments is not less than can be their own. In the realms of science there is no East, no West, no North, no South; we are brethren in a common cause; and that cause to-day is Urology.

ORGANIZED UROLOGY

If so much of a gratifying nature has been accomplished along urological lines by detached and unorganized efforts, how much more may be expected of the future, with urologists organized into coherent bodies, prepared to take up the burden jointly, and lend each other the encouragement of helpful suggestion, friendly criticism and healthy competition such as we find in this association? Such union of efforts and interests in this, our chosen field, have been in course of accomplishment for a number of years. The French Urological Association was formed in 1896, and has been active in its ten yearly meetings, bringing together the best of the French laborers in this field. This association furnished the inspiration for organizing our own Urological Association.

The German Urological Association is also a vitalized fact and is holding annual meetings that bring out the customary thoroughgoing and conscientious work of the Teutons. And just recently a call has been issued for the convocation of the first Congress of the German Association of Urology at Vienna for next October.

In our own country the American Association of Genito-Urinary Surgeons has, since its organization in 1886, made an enviable record and won high esteem by its work in a field closely allied to the one in which our ambitions lie; although its limited membership and somewhat different trend of work mark a distinction between the aims and ambitions of the two Associations; a distinction that readily admits of the continued existence of the two Associations as separate but harmonious bodies .

Our own sturdy young Association came into existence five years ago (in 1902), the crystallization of the efforts of Dr. Guiteras and his friends, backed up by the membership ever to be honored by the designation of "Founders," and to whom our grateful appreciation must ever be due.

This Association has a field of work that is unoccupied; that is inviting; that urges it to great deeds. It is built on broad, democratic lines. The merit system prevails and dominates its eligibility to membership and its councils. It invites independence of thought and freedom of speech—with scientific backing for such thought or speech. Precedent and conventionality are not named as guiding spirits of its policy, but PROGRESS, as sound and substantial as that fleeting, ever-changing Will o' the Wisp may be, is, I take it, the keystone of its creed.

That the need of such an organization has been urgent and has been felt by urological workers; that its establishment has been hailed with pleasure and supported with enthusiasm; and that its future lies before, rather than behind it; its duty plainly evident, its ambition commendable, its career assured—are all attested by its lusty growth in the few short years of its existence; by the character of its membership, and by its transactions already enacted. I presume there are few of its members who do not swell with pride, metaphorically, at the thought of being a member of this Association.

If these encomiums feebly express my esteem of membership in this body and the associations to which it leads, how shall I express my appreciation, even in a mild degree, of the honor you have conferred on me in making me your presiding officer for this session?

However unmerited, personally, was the selection; however deficient I may prove in endeavoring to meet the requirements, I cannot but thank you sincerely, heartily and gratefully for your indulgence; and at the same time, for the sake of your young progeny, the Urological Association, to invoke your continued interest, your loyal support and your active participation in its work.

THE PATHOGENIC SIGNIFICANCE OF CHEYNE-STOKES' RESPIRATION IN NEPHRITIDES.

By CHARLES G. CUMSTON, M. D., Boston, Mass.

IT may be assumed with all safe probability that Cheyne-Stokes' respiration may arise during the progress of nephritis, although the renal permeability need not of necessity be disturbed, and, on the other hand, in other instances, where the impermeability is almost absolute, this phenomenon does *not* occur; while in all the cases personally observed, either lesions of generalized arterio-sclerosis, or localized in the cerebral arteries, or cardiac lesions usually having an arterial origin, have always been noted. From all this arises the question as to what pathogenic value we may give to Cheyne-Stokes' respiration. It is quite classic to say that periodical dyspnea is, in the various nephritides, a uremic accident, having as exclusive cause a uremic intoxication of the organism. Such is the opinion of Dieulafoy, Widal, Charcot, Pic and Rendu, who have stated that when this phenomenon is encountered it implies a renal affection which has reached the stage of uremic accidents. However, for the past few years, the pathogenic interpretation of uremia in general, and the Cheyne-Stokes' phenomenon in particular, seems to have become more complex. Biot, Saloz and Rabé appear to be inclined to attribute to factors other than renal toxemia, an important rôle in the production of perodic respiration.

The frequency of cardiac lesions, and of the cerebral vessels, has led Merklen to admit that there is something else besides the uremic intoxication, this being, perhaps, a cause, but not the *only one.* He says: "When one considers the long tolerance of patients dying with atrophied kidneys, which are sometimes reduced to the condition of cicatricial stumps, one is certainly brought to conclude that uremic toxemia only enters in part in the pathogeny of the so-called uremic accidents. It is quite necessary to invoke the circulatory disturbance due to cardio-vascular asthenia and the phenomena of ischemia due to arterio-sclerosis. Thus it is for certain cases of dyspnea; Cheyne-Stokes' respiration in particular can often be explained by arterial anemia and venous stasis in the brain, which co-exist in arterio-sclerotic subjects having asystolia."

Certain nephritides offer lesions of cardiac and arterial insufficiency, associated with impermeability of the kidney coinciding with periodical dyspnea, and it is hardly possible in these cases to exactly define how much is due to each of these two factors, viz., renal insufficiency and cardio-vascular lesions in the production of Cheyne-Stokes' respiration. In the second group of cases the lesions of the circulatory system predominate, renal insufficiency is only slightly marked, while Cheyne-Stokes' phenomenon is present. In all these cases of nephritis it certainly is not uremic toxemia that is the cause, since the renal permeability is sufficient; the periodic dyspnea can only find its explanation in the co-existing arterial and cardiac lesions, since these alone, in the strict sense of the word, exist.

We would consequently admit that Cheyne-Stokes' respiration during the progress of nephritides does not necessarily coincide with renal insufficiency, but it always does with cardio-vascular lesions, and a large number of clinical observations confirm this rule. The relationship between the cause and effect of uremic toxemia and Cheyne-Stokes' respiration is usually found in the large proportion of clinical observations, but it is not absolute. More frequently the physician is apt to overlook lesions less evident than the renal changes, but which are quite as real, and are always found when the Cheyne-Stokes' phenomenon is present. Renal insufficiency may certainly exsit, *but if there are neither concomitant vascular or cardiac lesions, this phenomenon does not occur.*

To sum up, it may be said that between Cheyne-Stokes' respiration and uremic poisoning, there is only *a relationship of coincidence;* that between the former and lesions of the circulatory apparatus, there is a *necessary relationship,* that which unites the effect with the cause. Periodical dyspnea is consequently the result of circulatory lesions, more particularly local disturbances in the brain; it indicates a condition of impediment of the respiratory centers, which react to the insufficient sanguineous excitation by a deviation of their functional activity. In some cases, and perhaps they are the most frequent, there are arterial lesions reducing the caliber of the cerebral arteries, the process having slowly evoluted or being the result of an attack of acute endarteritis, from which results a notable decrease in the afflux of blood. In other cases one may be dealing with a purely functional impediment to the cerebral circulation, due to cardiac insufficiency. The heart no longer fulfilling its duties, incompletely irrigates the respiratory centers with blood. However this may be, each of these causative factors determine a more or less marked cerebral ischemia. Frequently these two factors become associated, the lesions of angio-sclerosis appear first, from which arises the tendency to cerebral ischemia and the heart overworks itself in order to re-establish an equilibrium. But when this organ commences to become fatigued, the irrigation of the blood again becomes defective, the centers are interfered with in their nutrition, consequently in their functions, and then the Cheyne-Stokes' phenomenon appears.

This pathogenic significance of periodical dyspnea during the progress of nephritides, a consequence of cerebral ischemia, is confirmed by clinical observation of diseases other than the various nephritides, where this phenomenon is encountered; whether the periodical dyspnea appears in diseases of the heart, in diseases of the brain or meninges, in infections or intoxications, everywhere and in all we find this fundamental fact, namely, an insufficiency in the cerebral blood supply. In the heart one finds lesions of myocarditis, steatosis or valvular insufficiency, all of which result in a diminution of the circulation. In affections of the brain and meninges one finds realized those mechanical conditions of compression producing the same effects directly on the cerebral arteries. In the infections it is the toxins which directly act on the heart and lower its vitality. Intoxications by chloral, bromides, etc., exercise a vaso-constricting and depressive action, bringing about arterial insufficiency in the brain. Why then should this same pathogenic theory, which is to be found in such varied pathologic conditions, not be the true cause of the Cheyne-Stokes' phenomenon in nephritides, without having recourse to some other pathogenesis, which, for that matter, is in contradiction with clinical observation?

The notion of cerebral arterial insufficiency as a cause of Cheyne-Stokes' respiration immediately explains the favorable action of morphine in the treatment of intermittent dyspnea. The well-known vaso-dilating action of this drug counterbalances, by favoring the flow of blood, the insufficient irrigation due to the narrowing of the sclerotic arteries and from this vaso-dilatation a larger afflux of blood results, with a diminution of the cerebral ischemia and the disappearance of Cheyne-Stokes' phenomenon. Now, if the toxic theory be admitted, this fortunate result from morphine can hardly be understood. And then again, one should take into consideration the very variable influence of digitalis on Cheyne-Stokes' respiration, which is absolutely in accord with the theory we uphold. After the administration of digitalis the Cheyne-Stokes' phenomenon may either disappear or, in other cases, its intensity may be increased, a fact easily understood when one takes into consideration the vaso-constricting action of the drug.

Now, then, in other cases, the cardiac muscular fibers may be intact, and then digitalis increases the functional work of the heart, which triumphs over the ischemia resulting from the vaso-constriction of the vessels, and, consequently, the Cheyne-Stokes' phenomenon will disappear. In the case of a diseased cardiac muscle, digitalis will have no effect, the muscular structure of the arteries alone remaining sensible to its influence; from which arises a vaso-constriction of the blood vessels, an increase of the cerebral ischemia, and following this there is a functional deviation of the poorly irrigated centers, from which results an increase in the intensity of the Cheyne-Stokes' respiration already present.

And lastly, this pathogenesis of periodical dyspnea explains why it is not met with in acute and hyper-acute nephritides. Uremia certainly exists in these cases, and intoxication of the organism is certain, because it is made manifest by various disturbances, and, nevertheless, in no case that I have seen, or have read of, has the Cheyne-Stokes' respiration occurred. And this is simply because the affection undergoes such a rapid evolution that it leaves no time for cardiac lesions, or those of the cerebral vessels, to arise.

The variable condition of renal permeability in cases presenting the Cheyne-Stokes' phenomenon, the constant presence of arterial and cardioarterial lesions, the presence of this phenomenon in various affections, the variable action of digitalis and morphine, the absence of periodical dyspnea during the course of acute nephritides, appear to me to form a sufficient amount of proof allowing us to admit that the Cheyne-Stokes' respiration is produced by factors other than renal toxemia alone, and that it is a symptom of cerebral arterial insufficiency and not of uremia. We have thus come to the conclusion that the Cheyne-Stokes' respiration of nephritides, which, for many years, has been considered an important symptom of uremia, should no longer be regarded as such, and from a more general viewpoint, we believe that the symptomatologic ensemble of uremic poisoning itself is not quite as vast as various eminent writers would lead one to believe.

The clinical symptoms which an accumulation of toxic principles in the blood are supposed to give rise to, are probably very frequently merely the consequence of concomitant organic lesions, and Chantenesse and Tennesson have demonstrated that hemiplegia and epileptoid attacks encountered during the progress of uremia are the result of localized lesions of cerebral edema.

Merklen and Bernard also have expressed the idea that "the entire pathogenic problem of uremia is not comprised in the retention in the blood of non-eliminated substances." And following out their idea, may it not be assumed that uremia is a far too vast and complex a subject, in which an entire series of symptoms have been included, which, to our way of thinking, very frequently have quite a different origin than that of uremic intoxication?

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THE ETIOLOGY AND PATHOGENESIS OF INFECTIOUS ARTHRITIDES OF URINARY ORIGIN.

By GORGES BODIN, Lyons, France.

THE acute lesions which involve the urinary apparatus do not generally give rise to urinary fever. It goes without saying that during the progress of a urethritis or an acute cystitis, a rise in temperature may be noted, accompanied by some general phenomena, but these are symptoms similar to those encountered in bronchitis, etc., and usually these lesions undergo their evolution in apyrexia. On the contrary, in chronic lesions, we frequently encounter urinary infection, and consequently one is obliged to admit that their very chronicity must realize certain conditions which favor the apparition of these accidents, and particularly pseudo-rheumatismal arthritis. These conditions may depend, either on some external influence, the patient's general health, or on some local condition. These will be studied separately.

The external causes always act indirectly and can only create a predisposition for these morbid manifestations, or, at the most, provoke their apparition, thus only playing the part of an occasional cause. Considerable importance must be given to cold, and Ollier, in speaking of urinary arthritis, said: " One more frequently observes it in subjects who have been uncovered for a long time during catheterism, or who have taken cold in a bath administered shortly afterwards." Like in all the other circumstances where its influence is manifest, cold evidently acts here by diminishing the resistance of the organism. Everything which acts on the genito-urinary organs produces a profound disturbance in calorification, and those patients who have undergone an operation are most susceptible to the action of cold. It is known also how surgical tentatives result in hypothermia, and the mere introduction of a catheter can produce syncope. In all these cases there is a diminution of the vital activity and it has been noted that the diseases of the urinary passages have the power of mentally demoralizing the patient. This brings us to say a word as to the influence of general health.

The chronic lesions may involve the economy during a period occasionally of long duration, lessening the vital forces and preparing for infection a soil which has already become deprived of all its reserves for fighting against disease. However, one exception may be made for certain urinary patients whose bladder impunely suppurates for years and who, according to Guyon, possess a true acquired immunity, permitting them to indulge in traumatic and dirty catheterisms without any detriment to their general health.

Whether or not an articular localization of the infection is influenced by an arthritic diathesis is a question much discussed, but there is reason to believe that this morbid state places the joint surfaces in a condition of lesser resistance and makes itself manifest by the history of former attacks of acute articular rheumatism, which provoke a local predisposition for infectious manifestations. It should also be pointed out that Velpeau incriminated the latency of constitutional states.

We should now consider another order of conditions, causing us to penetrate into the domain of the pathogenesis, but which, however, will permit us, by the more direct relationship that they have with the eclosion of the articular manifestations, to settle the manner of action of the direct determining agents, and also the way in which infection arises.

It is known that the urinary arthritides, which are articular pseudo-rheumatisms, always manifest themselves after maneuvers or operations performed on the urethra or the bladder, or still more during the progress of an inflammatory or suppurative affection of these organs. Now the effects determined by these two conditions may be summed up in a single sentence, namely, *a change in the urethral or vesical mucosa.*

Guyon has justly said that urinary fever may be provoked at the will of the surgeon. Every time that one is obliged to employ force for the introduction of a catheter, or fatigues the urethra by too prolonged séances, there will be a rise in temperature, this being all the greater the more the surgeon has been "mechanical," using Guyon's expression. Every operation, whether violent or not, which has had as a consequence the necessity of much effort, will be accompanied by an irritation of the urethral mucosa and an erosion, although perhaps very slight, of the epithelium of this mucous membrane. Tentatives at catheterism several times repeated set up a local congestion, and it is well known that any local congestion is accompanied by a hypersecretion, which places the walls of the canal in a condition of resistance greatly diminished in regard to mechanical irritations. Now, supposing that a last try at catheterism, for example, is made after these tentatives, but is effected with only little effort, the epithelium will be eroded and opens a new door to infection. Now strictures, from the very nature of their pathologic anatomy, require, in order to be passed by instruments, the expenditure of a certain amount of force, often involuntary on the part of the surgeon, and more frequently than not thus occasion indirectly certain lesions, from which arises the frequency of infectious manifestations in subjects having stricture. The same may be said of lithotrity, cystotomy and so forth, all surgical interferences necessitating long mechanical maneuvers and are in themselves the cause of the lesions which follow.

In inflammatory infections, the same congestive condition, as is created by operative irritation referred to above, is directly produced by the physiologic action and renders the epithelium in a condition to give way before the slightest traumatism. It is consequently from this cause that infection takes place.

The rôle of the epithelium, which is a barrier between the organism and the external world, was well understood by Robin, who wrote: "The physiological rôle of the epithelia is merely that of physical protection without any special secretion or absorption, as soon as they are placed in such conditions that they form stratified layers, as, for example, in the bladder, vagina, mouth, and esophagus. This fact is particularly distinct when they become dried and can no longer receive the principles furnished by the blood plasma in sufficient amount. Upon the surface of various organs, their rôle consists, in fact, only to preserve the underlying chorion from all direct contact, at the same time rendering easy the slipping of the parts, and to oppose phenomena of absorption, as in the bladder."

This function of the epithelia dominates, so to speak, all urinary pathology, and, as the celebrated experiments of Kuss and Sussini demonstrated, it is not necessary that there should be a wound of the bladder walls, but merely a shedding of its epithelium in order to have urinary absorption take place.

When one studies the condition of the urethral and vesical epithelia in diseases of the urinary tract, one discovers that very often these will be found in conditions such that their partial desquamation is easy, either following upon a slight traumatism or that the urine undergoes ammoniacal fermentation, which has as a consequence the dissolving of the epithelial cells. It is nevertheless well established that the primordial condition for infection to take place is the existence of a lesion of the urinary mucosa. The pathogenesis of all the accidents which may result from this is the best proof. However, before taking up this study, I wish to refer to a fact which merits being remarked, namely, that the frequency of these accidents is incomparably greater in the male than in the female. This is easily explained, as Phillips has shown, by the greater length of the male urethra; the latter being much longer, renders catheterism more difficult and requires more force, from which arises the greater chance of traumatism.

Any disturbance of micturition also appears to facilitate this infection, and above all is this true of retention of urine; it produces a stagnation of all the elements contained in this liquid, allows decomposition, fermentation, and especially the pullulation of bacteria. It is thus that, under the influence of a stricture, distension of the bladder occurs, which has as an effect to produce stretching of the vescical epithelium capable of producing lesions in it and favoring alkaline fermentation. An experiment quite well demonstrates the influence of retention on the genesis of urinary infection. A culture being injected into the blood, the bacilli pass in part by the kidneys, where the rapidity of the blood stream prevents them from becoming arrested. But if the penis has been ligated, thus forcing the urine to stagnate in the bladder, a purulent cystitis is set up. Consequently, disturbances in the micturition aid in the appearance of infectious phenomena.

" The urine is one of the most dangerous liquids of the organism " (Velpeau). This opinion dominates the entire history of urinary infection. The coexistence of urethral and vescical lesions on the one hand, and urinary infection on the other, early led clinicians and physiologists to endeavor to discover what were the motive principles whose action was so injurious and rapid. I do not wish to undertake the study of this question, but it appears to me necessary for the understanding of certain facts to recall the principal data that have been acquired on this subject during the last twenty years.

Without referring to the theory of phlebitis and nervous shock, two theories were emitted to explain this pathogenesis. The one put forward by Dolbeau and Malherbe attributes it as a consequence of renal lesions, resulting in insufficient purification of the blood. The other, formulated by Velpeau in 1840, is that of urinary poisoning; it incriminates the entrance into the blood of excremental matters contained in the urine. The former theory does not explain the more numerous cases where infection takes place without renal lesions. As to the second, it received numerous objections resulting from the experiments by Feltz, Ritter and Bouchard. The latter demonstrated that the urine is incapable, when normal, to determine such accidents and one is forced to admit the addition of some new substance to the urine, namely the microbe or the toxins it secretes. In fact, under the influence of the microbic doctrines, as well as the experiments of Bouchard on urinary toxicity, and above all the work of the Necker School, an entire change in direction was given to the question.

We know that normal physiologic urine is inoffensive. Muron, and later Gosselin, found that subcutaneous and intramuscular injections of clear, transparent and slightly acid urine gives rise to no phenomena; but, on the other hand, alkaline urine gives rise to suppuration, gangrene or a tendency to gangrene, so that consequently, ammoniacal fermentaiton renders it dangerous. The agent of this fermentaion was found to be the micrococcus urae, and all the ammoniogenous microbes drew the attention of surgeons to the pathogenic part that bacteria could play in urinary infection, and a very considerable number of species were encountered. I will merely recall the diplococcus urae liquefaciens and the septobacillus anthracoides, described by Melchoir of Copenhagen; the urobacillus liquefaciens septicus of Krogius, and a non-liquefying bacillus studied by Hallé and Albarran, whose part seems a capital one in urinary infection. Next to these organisms should be placed the ordinary microbes of suppuration and, on the other hand, one may encounter specific organisms, such as the gonococcus and the bacillus of tuberculosis in those infections where they are the direct agents. But all of those which have most particularly been called attention to is the organism that Clado studied under the name of septic bacterium of the bladder, Rovsing, under that of Coccobacillus urae pyrogenes, and which finally Krogius, Achard and Melchoir demonstrated as being a microbe having all the characters of the bacterium coli. It appears, in fact, to occupy an important place in the general pathology of the urinary system, because its frequency has been noted by all observers, and among others, Hallé and Albarran have encountered it forty-seven times out of fifty. It should also be noted that the presence of these pathogenic bacteria of urinary infection has been found in the blood by Hartmann, Albarran and Krogius. Their influence is consequently indubitable in the production of the complications which arise, and no one at the present time can doubt this.

It has been shown that the primordial condition for the production of infection is a lesion of the epithelium of the urinary tract, as well as ammoniacal fermentation. These two facts merit being brought together, because one may admit that the alkaline condition aids in the destruction of the epithelial cells, so that they may be shedded by the slightest traumatism. Nevertheless, this must be considered merely as a contingent phenomenon. Ammoniuria is not an essential condition for the production of infection, many bacteria, agents of this infection, being themselves capable of producing acide urine, and foremost among these is the bacterium coli.

However this may be, the presence of these bacteria in the blood and genito-urinary tract, along with a lesion of the mucosa of the urethra or the bladder, suffice for one to foresee the entire pathogenesis of these complications. The necessary change must consequently be a profound modification of the epithelium, but this alone is not sufficient.

The urethral bacteria live normally in this canal devoid of activity; the congestive state of the mucosa awakens and increases their virulence. An exception, however, should be made for the bacterium coli, because all observers, since 1887, who have studied these various bacteria are in accord that the colon bacillus is not to be found in the normal urethra, and Melchoir has said " there is in these researches a fact worthy of attention, and that is that the most frequently encountered cystic microbes, the bacteria, so to speak, specific of urinary infection, should be so rarely found in the urethra." On the other hand, examining the bacteria of the prepuce and vulva, he found, to his great surprise, the colon bacillus in 25 per cent. of the young boys examined, and in 50 per cent. of the young females. Thus, this organism does not exist in the urethra, but may grow at its entrance. It does not penetrate the canal spontaneously, and must be introduced by the means of an instrument, and this explains the frequency of general manifestations following catheterism, the permanent catheter, internal urethrotomy, in a word, any operation which may introduce into the urethra the bacteria normally present at its external orifice.

The pathogenic agent, and, in particular, the colon bacillus, once introduced into the organism, will produce accidents. It has been shown that the arthritides complicating diseases of the genito-urinary apparatus, may occur in two forms, namely, the suppurating and the non-suppurating. We should consequently ask, in the first place, if, among the agents encountered in the urine, there are any which are pyogenic.

Independently of the streptococcus and staphylococcus, which are not always direct causes in the genesis of these accidents, it may be questioned whether or not the colon bacillus can produce pus. The researches of Lesage and Macaigne have demonstrated that there are two types of this organism; one that is met with in diarrhea and produces septicemia, the other which, injected at an ordinary dose, only produces suppuration. It is evidently to this latter form that are due the local accidents of urinary infection, at least in certain cases.

The researches of Escherich have demonstrated that the bacterium coli is virulent, because the inoculation of from 1 to 2 cc. of slightly alkaline broth, in which a culture has been grown at 37° C., kills in from one to two days a rabbit inoculated subcutaneously and in the ear, the guinea pig subcutaneously and in the peritoneum, and the mouse subcutaneously. These experiments have equally proven the difference in the virulence of the two types of bacterium coli which have been described. The virulence of the pyogenic vairety is far less than that of the cholerigenous type; when inoculated subcutaneously it produces abscesses, but no general infection, because it is found neither in the blood nor spleen. The local lesion, from its intensity, is alone the cause of death. Even experimentally, it always preserves this property of provoking suppuration, a property which appears to be due to a lesser degree of virulence, because it has been demonstrated that a very virulent bacterium coli may become attenuated during the experiments, producing only suppuration where formerly it determined a septicemia.

From all this it results that the colon bacillus may be the agent of suppurating arthritides of urinary origin, and that, very certainly, in the majority of cases, considering the frequency and constancy with which it is found in the urine, it is this organism which must be incriminated. But, how does this local infection take place? The blood current is evidently the route followed by this agent in order to arrive at the articular surfaces. Brought into the right heart, it goes through the pulmonary circulation, penetrates the left ventricle and from there into the general arterial system, where it will give rise to localizations in those tissues placed in a condition of lowered vitality, be this due to traumatism or some former affection.

The joints are among these, and Schüller's experiment could be repeated here and would bring a certain proof to the facts that the clinic itself seems to present us with. Kaspareck, having cut the sciatic nerve, provoked an articular localization; will not direct traumatism act in the same way? According to all experimenters, Courmont, de Saint-Germain and Charrin, it is the synovial membrane which is the seat of the maximum reaction in infection and infectious arthropathies make their appearance in the form of synovitis. Courmont has demonstrated that the synovial membranes are a soil of predilection for attenuated infections. Thus, the staphylococcus, introduced into the blood, produces a suppurating arthritis, instead of provoking a septicemia, as in acute infections which are not accompanied by arthritides; but it is necessary that the culture should be sufficiently attenuated in order not to give rise to lesions of the kidneys or muscles. These results have been confirmed by Saint-Germain, who produced arthralgia, serous arthropathies, and frequently, suppurating arthritides. Unfortunately, these experimental results are not sufficient, and Triboulet, who has experimented in many ways, came to no results; but this can be conceived, if one recalls the intensity of the reaction produced in these cases, which is often accompanied by fatal septicemia. And, lastly, as convincing proof of this action of the bacterium coli, let it be recalled that Sevestre and Gastou have recorded a case of suppurating arthritis having the bacterium coli as its etiological factor, because the fluid removed from the joint by puncture one hour after death gave a pure culture of this organism.

This direct action of bacteria is, nevertheless, only one of the ways in which these joint complications may be produced. The toxins that these agents secrete have a similar power, that experiments and clinical observation have demonstrated beyond reasonable doubt, and Triboulet says: " During an infection, when no germs can be discovered, this may be due to the fact that the disease is the result of the secretions of these germs, or to their dead bodies carried by the circulation to the foci. The disease once created may, in its turn, serve as a point of localization for secondary infectious agents. This sums up the entire theory of urinary toxemia, to which Guyon has particularly called attention. Behind a stricture and in the urethral ampoula behind, in a bladder in retention, the bacteria secrete their toxalbumins. Now, if a traumatism occurs, absorption of these toxins takes place, which causes a reaction of the organism. It is not an infection, because it appears very shortly after, instead of giving place to a period of incubation necessary for an infectious agent, and the intravenous injection of the urine gives rise to a similar reaction. Neither is it due to the normal principles of the urine that these effects can be attributed, because they are also produced, and identically so, by the injection of a sterilized culture of the bacterium coli. For that matter, no reasoning allows one to refuse to this agent in the production of arthritides a part that is generally conceded to belong to Löffler's bacillus, and it is well known, and clinical facts prove this, that, during diphtheria, serous arthritides and periarthritides occur, although there are no bacteria in the liquid drawn from the joints.

The action of these microbes on the nutrition, by the intermediary of their chemical secretions, is comparable to that of mineral poisons introduced into the organism, but with a far more terrifying action. Often, even, the infection is only possible when some former disturbance of the nutrition has been present, which obliges the organism to consent to the infection from the fact of its diminished defenses. These disturbances, caused by bacterial poisons, may even, so great their intensity appears, change the temperament of a person, and it is thus that Sokolowsky has observed phenomena of arthritism arise in cases of tuberculosis undergoing a slow evolution.

Therefore, one cannot be astonished to observe benign complications, such as simple arthropathies, having as a cause these poisons. Like all bacteria, the colon bacillus secretes toxins; these toxins penetrate into the circulation and are thrown to all parts of the organism, ready to produce various reactions upon those points which do not offer a sufficient defense to its action. And experience has shown that this is not merely theoretical, because Charin has observed a sterilized culture of the pyocyanus injected in the joints remain pyogenic. On the other hand, Krogius has produced the same lesions by an intravenous injection of a sterilized culture of uro-bacilli, and it has been noted that the same writer, operating under the same conditions, with sterilized cultures of the colon bacillus, has seen the same manifestations occur. According to Bois, Rodet and Roux, these filtered cultures of the bacterium coli produce hypothermy.

The pseudo-rheumatisms of urinary origin are consequently produced in two ways: (1) by the action of the bacteria themselves; (2) by the toxins that these microbes secrete. These are the results that experiments and daily observation plainly demonstrate for all the other infectious manifestations, which are in accord with the facts known of the general pathology of urinary infection.

Kaspareck, basing himself on the influence of innervation as a productive cause of suppurating arthritides, led one to believe that these phenomena were the consequence of either peripheral or medullary nervous lesion. Triboult and Thomas found during the autopsy of a female dying from puerperal pseudo-rheumatism, a systematic degenerative lesion of the posterior radicular system, with thickening of the arachnoid and pia mater at the point of entrance of the roots. But here one is dealing with two consequences of general infection making its localization on two different serous membranes, the one articular and the other medullary.

The pathogenesis of urinary arthritides is above all a microbic one, whether directly or by the intermediary of its toxins, it is always the microbe which acts. In this very rapid study we have considered more particularly the colon bacillus, but it is evident that this is not the only agent of urinary infection. All the bacteria encountered in the urine may also provoke it, and in most instances one will find that the case is one of microbic association. The specific bacteria may also be the determining cause, accompanied or not with other bacterial species, as, for example, pseudo-rheumatism of gonorrheal origin, in which the gonococcus is often wanting. We also have observed a case where the casual agent was Koch's bacillus; here, as elsewhere it produced local lesions, which presented themselves with their own characters and evolution. Each one of these forms takes on the general aspect of pseudo-rheumatism, but all differ by a capital point, viz., the variety of the pathogenic agent. And if I have considered more particularly the part played by the bacterium coli, it is in the first place because it is the most common agent of urinary infection, while its action in the production of arthritides is less known; and the study of other bacteria would be going over cases of pyemic, gonorrheal or tuberculous arthritides, whose study has been quite completely gone into by others.

A STUDY OF GONORRHEAL PUS IN STAINING SERA, WITH SPECIAL REFERENCE TO PHAGOCOYTOSIS.

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GONORRHEAL pus is a living pus; we have studied it in serum and we have described the manifestations of its activity and phenomena announcing its dissolution and death. After this experimentation it naturally lead to my carrying out a number of experiments on the action of stains on the pus elements, especially stains that have been termed "*vital.*"

In point of fact it is known that certain coloring substances, such as methylen blue and neutralroth, employed in an extremely diluted solution in isotonic serum, possess the property of coloring living cell elements, or at least certain parts of these elements, without in any way interfering with their vitality.

These substances, which possess a special power of permeability in living elements, have been termed *vital stains*.

The idea of staining certain elements of the organism *in vivo*, in order to observe them more easily and to preserve them as much as possible from any change, is of old date. Many experimenters have injected various coloring substances into the blood, and have studied their elimination, endeavoring, by this means, to elucidate certain histological and physiological problems pertaining to the kidney.

Other experimenters have profited by the propriety presented by certain stains to become electively fixed on certain cell elements, and it is from the affinity of methylen blue for certain nervous cells that Ehrlich was able to found his celebrated method for the staining of nervous elements.

One has tried also to bring the coloring matter into contact with cells still living, but separated from the organism; this is the post-vital stain or " supra-vitale Farbung " of Arnold. It is to the results obtained by this method that I will preferably consider, and is the one that I have employed for the study of gonorrheal pus.

The manner of reaction of gonorrheal pus with neutralroth has been more particularly worked out.

I believe it interesting to enter into a few details on the subject of this substance and particularly its histo-chemical reaction, as these bear considerably on what is to follow. Neutralroth or toluylen red is a hydro-chloride of dimethylamidotoluphenacetin. It was discovered in 1879 by von Witt and introduced by Ehrlich into histologic technique only in 1894. This authority was the first to point out the propriety possessed by this substance for staining living cells. Neutralroth is a blackish brown powder, very soluble in water. The color of the mixture is most variable according to whether the medium is acid or alkaline. In very weak proportions in distilled water this substance only gives a slight reddish tint drawing a little bit on the violet. This color becomes more rose if the solution is slightly acidified by the addition of either mineral or organic acids, while it becomes a reddish brown if the medium is rendered slightly alkaline.

Ehrlich had long ago drawn the attention to these very distinct changes of color of the solutions of neutralroth according to the acidity or alkality of the solution. He showed that traces of alkali contained in well water, and even the carbonic acid of the air, influence the change of color of the solution of neutralroth.

Himmel took up these experiments and completed them. This author considers that the principal rôle is the acid or alkaline reaction of the solution in order to explain the mechanism of the vital staining by this substance. He demonstrated that a very dilute solution of neutralroth in an alkaline serum remained colorless, while the same solution acidified became an intense red. He concludes that: "One may obtain a very intense red color with weak solutions of neutralroth, if the substances to be stained possess a sufficient degree of acidity." During his researches on the cells of various fruits, he was able to convince himself that: "With the same quantity of the stain, the staining of the vegetable cells and the surrounding liquid was more intense in those cases where the acidity of the fruit was most marked."

This property of neutralroth should be recalled and we will now study more closely the action of this stain on living cells. Galeotti, in a critical review on the staining of living cells, collected all facts noted by previous observers. From former observations and his own experiments he concluded that those parts of the cells which were really living (nucleus, protoplasma) resist staining so long as the cell survives. "The grains of secretion alone fix the stain" and "all the other formations which do not take an active part in the functions of the cell." Galleotti's conclusions are at present universally admitted and consequently it may be assumed that neutralroth has been particularly used to detect certain products of cell elaboration.

Regaud and Policard have used it in order to make evident the process of elimination in the urinary tube of Ophidians.

Quite recently Renaut demonstrated that neutralroth shows up the grains of segregation in the cells of the xiphoid cartilage of the frog, to which he attributes as probable the rôle of nutritive reserve. In his writings that he has published on the study of gonorrheal pus by neutralroth, Plato thus sums up the result of his observations. "The substances which stain in the interior of the leucocytes are albuminoid matters which have been ingested by the cell, such as bacteria, red blood cells, spermatozoides and products of cell dissolution."

We have seen what neutralroth makes evident in living cells, but more extensive experiments have been made and very interesting facts have been observed which permit one to understand the intimate mechanism of the action of this stain and I will briefly describe the facts acquired and the hypotheses to which they have served as a basis.

During numerous and carefully conducted experiments, Himmel, in studying leucocytes, noted that in the conditions of ordinary vitality of the cell, all bodies ingested by it became stained, and I will give a rapid description of the facts acquired by this experimentor.

He produced an experimental leucocystosis in a guinea pig by injecting sterile broth into the peritoneal cavity and in order to obtain phagocytosis, he introduced various substances, such as talcum, cotton, dead or virulent bacteria, which he introduced into the peritoneum or placed in contact with the cells present in the peritonial exudate. The latter is then mixed with a weak solution of neutralroth.

In every instance where the cell had preserved a normal vitality, Himmel saw the organic or other bodies which had been ingested by the cells become stained by the neutralroth very deeply. All conditions which changed or diminished the vitality of the cell influenced directly the staining of the substances ingested.

If, by quinine, the phagocytic properties of the leucocytes are destroyed, it will be seen that staining does not take place in the interior of these leucocytes.

The effect is the same whether one applies a high temperature, serum, or even if the leucocytes are taken from a weakened animal. In all these cases the phagocytic and oxidizing properties of the leucocytes are diminished.

Plato had already drawn attention to similar phenomena and remarked that, in the cells possessing a low vitality, the staining of intraprotoplasmic foreign bodies was only of slight duration.

The attack on the cell vitality may be produced by the action of the substances ingested by the cell.

Himmel noted the decolorization of the preparations took place more rapidly when the white cells are gorged with very virulent bacteria. He even observed that, if the number of bacilli ingested is considerable and their toxic action on the cell very pronounced, no staining takes place.

We have now studied those conditions which cause a variation in the intensity of the stain by neutralroth. This stain appears to depend much less on the nature of the bodies ingested than the degree of the cell containing them.

There is one point still to be considered and I shall have then finished with the action of neutralroth, and this is: what is the origin of the stain? Plato invokes a phenomenon of condensation. The albuminoid substances included in the leucocyte absorb a larger quantity of the stain and oxidize it. But this explanation does not hold when the foreign body is of an inorganic nature like bits of talcum, which do not absorb the stain (Himmel).

The explanation given by Himmel is far more plausable and I will quote him. " If the talcum ingested stains, it is because each fragment is surrounded by a zone of acid secretion produced by the leucocyte. It is this very acid zone surrounding the fragment of talcum which becomes deeply stained by neutralroth, present in the cell. Alone the granuloplasm appears possessed of oxidizing properties. It goes without saying that if the substance ingested by the phagocytes becomes impregnated by the acid secretion surrounding it, the intensity of the stain will be increased."

" The living leucocyte, which possesses a slight alkaline reaction, does not stain by neutralroth," but " when once dead it no longer elaborates an acid secretion, and then appear the phenomena of diffusion in the interior of the leucocyte and the naturally alkaline reaction of the cell neutralizes the acid medium surrounding the included body which becomes decolorized."

Regaud and Policard, in their studies on the kidney of Ophidiens, concluded that the staining of the grains depends on the cell which elaborates them. " The staining power of neutralroth is not the entire property of the condensor, but of a fluid layer which surrounds and imbibes it in the protoplasmic vacuola, where it is snugly lodged. It is this elaborating layer of the grains of segregation, and not the latter when once made, which fixes neutralroth."

We now know the properties of this substance, and the question arises, what are the results obtained by its use in the study of gonorrheal pus?

In the first place let me say that neutralroth stains the gonococcus in dry pus spread on slides. Plato advises the following formula: Saturated solution of neutralroth 20 cc. in 100 cc. of water. This affinity of neutralroth for dead gonococci merits being mentioned, but we have nothing further to say. This is merely a new technique for the staining of Neisser's organism in dry pus and these procedures are sufficiently numerous and varied so that I am not desirous of adding another to the list.

What I am desirous of studying, however, is the manner in which fresh gonorrheal pus acts when placed in an isotonic serum to which has been added a very minute quantity of neutralroth. It is in Germany that the first important observations on this subject were made, and I would particularly mention the writings of Plato, Bibergeil and Unna. I have been able to confirm the perfect exactitude of these former observations and it is only upon certain points that I have something personal to say. The technique is of the simplest. A salt solution at the strength of 8 in 1000 is made; to this a very small quantity of saturated solution of neutralroth in distilled water is added. Plato gives the following formula: Saturated solution of neutralroth 1 cc., salt solution 100 cc. This solution has appeared to me too concentrated and I have been able to obtain finer differentiations with much weaker solutions. The stain takes place more slowly, but it has appeared to me more delicate and the stain elections have appeared more perfect. Strong solutions present the inconvenience of tinting the protoplasm of all these cells in a light yellow and thus render difficult the differentiation of certain intracytoplasmic granulations which present only a slight staining affinity for neutralroth and become weakly tinted. I have obtained excellent results by employing the following solution: Saturated watery solution of neutralroth 1 cc., salt solution 150 cc. The quantity of serum may even be carried as high as 200 cc.

In daily work the staining solution is prepared extemporaneously by adding to the serum small doses of the solution of neutralroth until the liquid has taken on a slight yellowish red tint. A drop of this solution is placed on the hanging-drop slide, a small bit of gonorrheal pus is then taken on a platinum wire and mixed as intimately as possible in the serum. All lumps should be avoided, representing masses of cells which considerably hinder observation. The mixture once prepared the covered glass is placed on and held in place with parafine.

If now the preparation is examined with a high power objective (oil immersion should not be used so that no compression is produced on the slide which would produce currents in the serum) the first thing observed is the perfect preservation of the movement of the leucocytes. These movements are quite as active as in a preparation made with an unstained serum used for control.

After a few minutes, the time varies according to the concentration of the serum, one will perceive that in the preparation where all the elements were, in the first place, unstained, certain points have become stained more or less intensely. The stain has become fixed on the nucleii of the dead cells which represent about 10 per cent. of the total number of leucocytes. The cells whose nucleus is thus stained, are round, and their protoplasm takes on a slight yellowish tint. Other leucocytes have totally unstained nucleii and present in their protoplasm stained grains, some being very intensely stained a reddish brown, the others less markedly so. These colored grains represent the gonococci while others are granulations whose nature, as I shall show, is considerably discussed.

The gonococci are admirably brought in evidence by this method. Against the unstained or very slightly stained background of protoplasm, they appear deeply tinted reddish brown, presenting their typical shape and usually grouped in pairs. They vary in number; sometimes they infiltrate and actually riddle the protoplasm of the cell, while at others they are few so that only two, four, or six gonococci will be found in each cell. They always occupy the protoplasm, and I have never been able to distinctly find them in the interior of the nucleus. Like Plato, Himmel and others we noted that beside the stained gonococci there were others which remained unstained, or were only slightly tinted in yellow.

I have observed, as did Himmel, that these unstained forms are especially frequent in those cells in which the organism was very numerous. These gonococci which resist the staining action have never appeared very abundant in my observations. It is quite possible, and I would especially call attention to this subject, that they may have been confounded with certain granulations of the leucocytes and especially with eosinophile granulations. Eosinophile leucocytes are constantly present in the pus of gonorrhea.

They are more or less abundant, according to the time of the disease, its extension and localization. The granulations are sometimes very fine, while at others they are few in number and of large size. Under ordinary conditions of experimentation these granulations do not stain with neutralroth or only become colored a very light yellow.

These cells stuffed with granulations may upon a superficial examination be taken for cells containing unstained gonoccocci. Therefore, I have thought it wise to point out this cause of error.

The extra-cellular gonococci and other organisms which are frequently encountered in urethral pus associated with the gonococcus, remain unstained. At any rate a few of them (about 1%) are weakly stained red (Himmel).

The gonococci are more or less abundant according to the nature of the gonorrhea. The variations in the proportion of bacteria contained in the pus have been studied and demonstrated by many writers. In all cases which have come under my observation, the gonococci placed in evidence by neutralroth have always been in exact proportions with those which are stained in dry pus by the ordinary methods such as gentian violet, methylen blue, thionin, and so forth.

If one attentively examines a certain number of cells containing this organism, one will always see, if not in every one, at least in many of them amibold movements develop. These are always slow. It has appeared to me that the leucocytes containing the organism always present, in a most evident way, signs of a lowered vitality. In these cells we have observed very distinct movements, the granulations became displaced, went away from or approached each other, but I believe that it would be timerous to attribute the production of these movements to the gonococcus itself. The organism, under these conditions, has more especially appeared to us to undergo the movements of the substance of the leucocyte itself, in which it is enclosed and it will be found to become displaced in the direction of the prolongations of the cell.

Plato, and after him, Himmel, have observed that passing from the granular substance of the leucocyte into the hyaloplasm, the gonococcus lost its stain. I can neither confirm nor deny these statements advanced by these two observers, because I have never been able to make similar observations with any degree of certitude.

I also have never seen multiplication of the gonococci in the plus cells, nor have I witnessed their disintegration under the influence of an action of defense on the part of the cell. On the other hand I have often been struck by the aspect of certain gonococci presented in preparations from eight to ten hours old. They appeared very markedly stained, swollen and rounded. It is possible that to this stage of tumefaction follows a phase of dissolution, such as Himmel has described for certain bacteria ingested by leucocytes, but I am loath to emit any conclusion as to this subject.

After a certain time, which probably varies in direct relation to the vitality of the elements of the given specimen of pus, the leucocytes present the phenomena that I have already described as forerunners of cell death, their activity becomes lessened and the movements of translation cease, or at any rate, are very slow. It is at this time that Brownien movements become manifest in a large number of leucocytes, while the gonococci present manifest movements of oscillation. With a sufficiently high power the organism will be, so to speak, seen to be bombarded without cessation by a mass of granulations endowed with excessively rapid movements. Under the influence of these repeated shocks the gonococcus undergoes movements of translation, however, much less rapid than those of the granulations surrounding it and appearing to attack it.

Now, besides the nuclei of certain cells, the intracellular gonococci, certain granulations included in the protoplasma of the leucocytes will be found to have fixed the stain. These granulations are more or less numerous according to the specimen of pus examined. The pus of acute and recent gonorrhoea with a profuse discharge and greenish in color, has always furnished leucocytes containing quite a number of introprotoplasmic granulations. These become more scarce in samples from chronic gonorrhea, gleet and urethritides having an only slightly marked inflammatory reaction, with a serous pus.

Their staining appears to occur more slowly than that of the gonococcus; it is, however, always less intense, varying from yellow to a light brown. Rarely these granulations stain a brick red, or a brownish red, as do the gonococci, and under these circumstances the elements thus stained have always appeared to me easily distinguishable from the gonococcus. In size they vary, are often irregular in shape and only a few are found in one cell.

Most frequently, I would again repeat, these granulations stain less sharply than the gonococcus and can be distinguished from this organism without difficulty.

The nature of these granulations is much discussed. I would first say that there is a point that I believe to have distinctly noticed and which may be of some utility in the solution of the question. The leucocytes which, in gonorrhoeal pus, contain the granulations in question, have a lesser activity than the cells having a colorless protoplasma. In my preparations, the cells possessed of very active movements never contained these granulations.

Several opinions have been emitted as to the nature of these stained particles. Is it a cell stroma? Himmel has replied in the negative. If the cell stroma took neutralroth, all the cells would be stained. Then, again, is one dealing with basophile or eosinophile granulations? Neutralroth hardly stains eosinophile leucocytes, but it fixes basophile granulations, staining them a reddish yellow. Consequently one may be dealing with basopile granulations, but control preparations stained with methylen blue or thionin showed the granulations to be very few, at any rate fewer than granulations stained by neutralroth. According to Ehrlich, Plato and Himmel, these granulations are the result of nutritive changes of the cell and its phagocytic action. This opinion appears to me the most plausible.

The hypothesis which supposes that these granulations are portions of protoplasm having a lesser vitality, a kind of focus of necrosis, which becomes stained by neutralroth, has this much in its favor that these granular leucocytes appear less active than the others. Himmel noted that the number of these granulations increases as time goes on. In spite of these facts, I rather favor the hypothesis emitted by Plato, Himmel and others, which is more in accordance with our knowledge of the action of neutralroth.

I have completely studied the aspect presented by fresh gonorrhoeal pus stained with neutralroth and, if one continues his observations, it will soon be noticed that the preparation slowly changes in aspect. From four to six hours after mounting the preparation, it will be noticed that the proportion of leucocytes possessing stained nucleii (10% in the beginning) has markedly increased. The nucleus of these leucocytes has become apparent and taken on a yellow stain. The number of leucocytes whose nucleus stains soon ceases to increase and if the preparation is examined at the end of twenty-four hours, especially if very weak staining serum has been used, all trace of the stain has disappeared. At this time the leucocytes will be found granular, their nucleii being distinctly distinguished by a special refrangibility. This decolorization occurs a little later when the serum used for straning contains a larger amount of neutralroth; at any rate, at the end of 48 hours the preparation is generally absolutely colorless.

I have elsewhere demonstrated that the leucocytes are active, protuding pseudopodes, become differentiated around the elements that they have ingested and that the vacuolæ having an acid secretion fix the neutralroth and reveals it, so to speak, on account of the chemical affinities already mentioned. Later on, the movements diminish, the vitality of the leucocytes becomes attenuated, the acid secretion ceases in the vacuolæ and the stain disappears. The leucocyte is dead.

The question arises as to whether this method has a practical side and in reply I would say that I believe it has, because I was often struck with the great ease with which the gonococci could be demonstrated. It requires a certain experience to succeed in making a good preparation of dried gonorrhoeal pus. This is due to a defective staining, spreading of the pus on the slides, or the fixing of the color. A number of cells are crushed during the spreading of the pus and the gonococci become placed among the leucocytes. The method of examination in colored serum avoids these many manipulations: it is quite as simple and as rapid as the examination of dried pus. The hanging drop is not absolutely necessary and the simple slide will ordinarily be sufficient. The drop of serum is covered with a cover glass which is held in place by four drops of parafine. A preparation such as this would not, of course, serve to study all the phenomena that I have described, but it is certainly a simple, elegant and rapid means of detecting the presence of the gonococcus.

EDITORIALS.

THE INDICATIONS FOR SUPRAPUBIC CYSTOSTOMY IN PROSTATIC HYPERTROPHY.

WITH the great advance made in the radical cure of prostatic hypertrophy, many of the older palliative interferences have been neglected of late, but there is one to which we would particularly call attention, as it certainly will render service in a few cases; we refer to suprapublic cystostomy.

In the first class of cases that we will consider, we will include only what we term "mechanical prostatics." In the beginning of this period one is dealing with an aseptic prostatic, suddenly seized with a complete retention of urine for some given cause. The patient will make violent efforts to urinate, which are useless, because the congested prostate completely prevents the urine from making its exit from the bladder. Nevertheless, it is absolutely necessary to relieve the patient by emptying the bladder, and the use of the catheter is the surest means. With a prudent and carefully conducted catheterism the patient will recover, for the prostatic obstacle will be passed by and, as soon as the bladder is emptied, the patient will be relieved. In order to prevent the return of this accident the patient should be properly instructed on the hygeine to follow and other necessary instructions. In very infrequent cases it may happen that, at the commencement of prostatic life, tentatives at catheterism remain fruitless, because spasm of the urethra becomes added to prostatic congestion, and here suprapubic puncture becomes necessary, and by relieving the congestion of the prostate, catheterism may be accomplished and further trouble avoided.

When the patient arrives at the second period of prostatism, one will usually find oneself in the presence of a patient who empties his bladder incompletely, and this for a certain time; but ignoring his trouble, he is suddenly taken with complete acute retention. In this case, as in the early stages, catheterism is formally indicated, but the bladder should be emptied with precaution so that vescical hemorrhage may be avoided. If catheterism is impossible, and this is an extremely infrequent occurrence, suprapubic puncture must be resorted to, because it should not be forgotten that in prostatics, puncture of the bladder when aseptically done, is less dangerous than one would generally infer from what the text-books say, authough it must be admitted that urinary infiltration or a prevesical abscess may arise from it. By relieving the bladder in this way the congestion of the prostate diminishes so that a catheter can later be passed without difficulty, and it is only those cases where, after suprapubic puncture catheterism remains impossible, that we believe suprapubic cystostomy is indicated; but in this case it should merely be temporary, the surgeon endeavoring to at once re-establish the normal course of the urine.

Oftentimes, one will be dealing with prostatics, having already had attacks of acute retention, and taken with a new attack, knowing the use of the catheter, have themselves tried catheterism in vain and without any precaution, so that the urethra will be found inflamed, thus rendering the passage of the catheter difficult and painful, and exposing the patient to false passages if he already has none. In these prostatics with acute retention and urethral false passages, but with aseptic urine, suprapubic aspiration would naturally in the first place be tried in order to empty the bladder and later on to be able to realize catheterism, but the latter, in spite of the vescical puncture, may remain radically impossible and in this case suprapubic cystostomy should be resorted to. Here, of course, the opening would be merely temporary, because, in these cases, when once the bladder has become rested and the prostatic congestion done away with, a permanent catheter can be introduced so that the urine can again make its exit by the normal passage, and little by little the hypogastric meatus will close. It is evident that one may, as Tuffier has proposed, introduce a permanent catheter and then close the suprapubic opening surgically.

In other cases, the patient will have chronic retention with infection, but a permanent catheter is not tolerated and here cystostomy will allow the proper escape of the urine. The same may be said if repeated catheterism is too painful, although possible, and one should, on account of the necessity of frequently doing this, resort to cystostomy, which avoids these repeated maneuvers, thus allowing the inflammatory lesions of the urethra to subside. Cystostomy is also proper when micturition, although quite possible with catheterism, incompletely empties the bladder, because the urine acts on the fundus of the bladder and from stagnation infection of the organ will occur. It is the same in the case of slow, chronic retention with micturition from overflow, but, in this case, permanent cystostomy should be adopted in order to facilitate retraction of the prostate and later on the urine may be made to pass by the natural passage.

Among the infected prostatics, the superacute type demands, perhaps, more than the others, an urgent interference; suprapubic cystostomy will certainly procure the relief so ardently desired, but experience teaches that, in this form, the chances of cure are small, while, in spite of the haste in operating, the evolution of the urinary accidents is merely retarded and the patient will rarely live but a few days. Poncet operated on ten patients in these conditions and they all died within fourteen days; the painful symptoms disappeared or diminished and thus the last hours of the patient were made more comfortable. As Bazy has pointed out, cystostomy is powerless in dealing with superacute infectious accidents, but it should and ought to be attempted in these cases. In acute urinary infection Poncet immediately performs cystostomy if there is still time, but this practice does not appear to us proper, because the permanent catheter has rendered great service in these cases and it is only after it has been shown that this treatment is unsuccessful that the bladder should be opened. If, in spite of the permanent catheter and bladder irrigation, no improvement manifests itself, the condition of the patient becoming worse daily from the increasing toxemia, suprapubic cystostomy is indicated.

In some cases catheterism may be impossible and all tentatives remain fruitless, resulting in urethrorrhagia and false passages. Here puncture of the bladder is indicated and, if after this, catheterism remains impossible, difficult, painful, or giving rise to urethral hemorrhage, cystostomy is, perhaps, the only means to employ against infection and one may at least have the satisfaction of prolonging the patient's life, especially if the kidneys are not involved. On the other hand, should one be dealing with an old chronic urinary subject, with serious general infection, death cannot be avoided.

Regarding the statistics it will at once be remarked that, in spite of the haste with which one operates, fortunate results are far from always occurring. Out of 19 cystostomies Poncet had 6 deaths, while Tuffier had 12 deaths out of 29 interferences. This is why Pousson advises to interfere rapidly, and he points out that cystostomy does not have any better results in controlling acute infectious phenomena than the permanent catheter, and he believes that no matter how dexterously or rapidly the bladder may be opened, there is considerable risk of losing these patients. We are perfectly willing to admit the good service rendered by the catheter, but when it is powerless to stamp out the progress of the infection, we believe that cystostomy is indicated in order to prolong the patient's life.

Old chronic prostatics who empty their bladder incompletely, or urinate by overflow, are almost always subjected to the influence of the urine collected in the fundus of the distended bladder and by the resulting lesions of more or less long-standing of the kidneys. The affection undergoes its evolution progressively, nearly without a rise in temperature, and it is the general symptoms which indicate the necessity of an interference, because the general condition becomes aggravated rapidly, so that the patient will soon become a urinary cachetic. Consequently, this infection should be stopped, and, if the temporary catheter with irrigations of the bladder are not successful, a suprapubic opening should be made. But it frequently happens that the permanent catheter, which momentarily has attenuated the general symptoms, has not been able to radically do away with them, because the affection rapidly continues its course. In these cases it is because the catheter only incompletely empties the bladder, and the urine undergoes its usual transformation, and the infection resists the permanent catheter. Cystostomy, when done in time, may, by allowing proper disinfection of the bladder, prevent infection of the ureters and kidney.

In other cases, and these form the great majority, the infection is controlled by the permanent catheter, but there are some. where once the instrument is removed, develop septic accidents of great intensity, and here an early cystostomy should be undertaken.

Performed for the relief of general symptoms, as a means of drainage, cystostomy is an excellent operation when catheretism has proved of no avail. In infected prostatics, it is in the chronic form that suprapubic cystostomy has given the greatest number of successful outcomes, but it is necessary that this interference should be undertaken early in the progress of the affection, because delay will give a very high mortality.

However, if the kidneys are affected, permanent cystostomy, although undertaken under bad conditions, will allow one to cleanse the bladder, combat the infection as much as possible and prolong the patient's life. The accidents of retention and infection are not the only ones which always menace the prostatic and we have painful cystitis, bladder hemorrhages and calculi, which frequently complicate the situation, requiring urgent treatment.

Occasionally, in spite of irrigations of the bladder, the use of the permanent catheter and the judicious administration of morphine, chloral or bromide of camphor, the pain will remain intense and it is here that the hypogastric opening will work wonders by relieving the patient's suffering.

Cystostomy appears to us absolutely indicated when there is free hemorrhage from the bladder in a prostatic, all the more so when this is due to the presence of calculi. This operation is, under these circumstances, the best remedy for the control of vesical hemorrhage, whose causative factors are infection and congestion. The blood cannot always be evacuated by the catheter, and when the hemorrhages resist all treatment and become serious by their frequency and amount, cystostomy must be resorted to if the patient's life is to be saved. After this has been done the congestion disappears, the infection can be treated with greater efficacy, while, at the same time, one may directly attack the source of the hemorrhage.

In the majority of cases of calculi in prostatics one will frequently find that the calculus or calculi are lodged in the fundus of the bladder and even if a lithotrite could be introduced the instrument would be unable to seize them; and then again, lithothroty performed in an infected bladder is always a dangerous matter, exposing the patient to serious septic renal complications. Suprapubic cystostomy is certainly indicated here as by it the calculi can be removed and the infectious accidents controlled.

THE RENAL THEORY OF PAROXYSTIC HEMOGLOBINURIA

THE destruction of red blood cells in the kidney, or the renal theory of hemoglobinuria, is based on very serious arguments and at the present time is probably the one most generally admitted. It has been defended by a large number of writers, who, for that matter, interpret the phenomena taking place in the kidney in many different ways. Here, as in the case of hemoglobinemia, one finds an entire class of symptomatic hemoglobinurias in which there is, without doubt, a renal process. Thus, in one of Hayem's cases, one was dealing with a hemoglobinuria occurring during the progress of acute articular rheumatism and there was in this case a congestive rheumatismal nephritis, characterized by the presence of albumin, renal casts and the excretion of numerous white cells. In another case reported by Robin the hemoglobinuria occurred in an elderly uremic female and death resulted from pneumonia. In this case there was no hemoglobinemia and autopsy showed odd interstitial nephritis upon which a very marked renal congestion had become grafted.

But is it to a renal process that hemoglobinuria in paroxystic hemoglobinuria is due? Bartels of Kiel and Botkin of St. Petersburg, believe that there is active renal hyperemia due to the influence of cold, while Stephen McKenzie considers that the cause of the destruction of the red cells in the kidneys is due to a vaso-motor action. According to the latter writer, there is, at the time of the paroxysms a cutaneous spasm throwing the blood back into the viscera and especially to the kidneys on account of their special vascularization. The red blood corpuscles pushed with much force and compressed in the glomerulae are there destroyed and their coloring matter passes into the uriniferous tubules.

Rosenbach admits a provoking cause, such as cold, acting in conjunction with some renal affection rather than a disease of the blood, and he has never noted any change in the globules during the attacks, nor any abnormal coloring of the serum, while examination of the urine has always demonstrated the presence of albumin before that of hemoglobin.

Lépine admits, besides paroxystic hemoglobinuria following a hemoglobinemia, a second variety of this infection, but this time being of a renal nature without the addition of any general affection. The renal lesion constitutes the entire disease, the hemoglobinuria merely being an epiphenomenon, producing no particular malaise, or other symptom than the coloring of the urine.

In order to prove this theory Lépine introduced a tube into both ureters of a dog, after which they were submitted to a pressure of about 60 centimeters, on one side with sterilized water and on the other with ammoniacal urine. After three hours of this pressure, the urine coming from the side where the sterile water had been used was normal, while that coming from the other renal catheter was tinted a dark red by the hemoglobinuria present. As the blood cells are well preserved in ammonjacal urine, it can only be the latter which destroys them. On the other hand when, following renal congestion, the red blood corpuscles have passed into the glomerulae they come in contact with a very dilute urine, or rather with a liquid very rich in water, which is not as yet urine. And, in general, the addition of urine to quite a large quantity of water, renders it capable of destroying red blood cells very quickly at the temperature of 10° C. When the latter arrive in the kidneys their dissolution is inevitable, but as soon as a sufficient quantity of plasma has transuded, those which come afterwards escape destruction. In order to explain why in the majority of brightics there is hematuria and not hemoglobinuria, Lépine admits that either the red cells do not pass through the kidney, or else they are accompanied by a sufficient quantity of plasma, and thus this authority admits that hemoglobinuria may be due either to hemoglobinemia or to some renal lesion.

Robin, basing his remarks on the evolution of the cases that he has observed, as well as the lesions found at autopsy, believes that renal congestion is the efficient local condition of hemoglobinuria. He adds that as yet we do not know the intimate action which destroys the red cells and gives liberty to the hemoglobin, but we do know that it is prepared, if not caused, by renal congestion; in other terms the latter process is the first stage of the local process terminating in hemoglobinuria.

Now an objection immediately comes on one's mind and, as Robin himself has remarked, it is too legitimate not to be asked, namely, why renal congestion, which ordinarily produces albuminuria and hematuria, ends in this case in hemoglobinuria? " It is not possible to invoke former renal lesions, because, on many occasions, one has witnessed congestive attacks in contracted kidneys end purely and simply in true hematuria. There is, consequently, something else beside the condition of the kidney. The renal act, no matter what it may be, would be powerless to produce hemoglobinuria if the general nutrition has not been in the first place involved, if the red blood corpuscles have not already undergone a lessening of their resistance from this nutritive disturbance."

Hayem also attaches the escape of hemoglobin to a congestive of attack in the kidney and he says: " At the time when violent vaso-motor perturbations break out, the blood is carried in large amounts to the internal organs and notably in the renal parenchyma. The renal congestion can be judged in a way, either by the discharge of dissolved albumin, or by a simple attack of albuminuria, and it is likely that this variation in the solution of the attack depends, not only on the intensity of the congestion, but also upon the more or less marked degree of blood changes; one may think, in effect, that this change is of a nature which would increase under the influence of a chilling of the body surface, and which, as a result, it is all the more pronounced the greater and more durable be the chilling. There consequently must exist, in individuals subject to attacks of paroxystic hemoglobinuria, a permanent change in the blood and notably a particular vulnerability of the red cells, perhaps also a change in the albuminoid matters, or the materials entering into the formation of fibrin."

It would thus seem that one may sum up the opinion of those who uphold the renal theory, in the following way: in paroxystic hemoglobinuria, the passage of the hemoglobin into the urine is due to a renal process aided by blood changes of a chemical nature.

BOOK REVIEWS.

The Johns Hopkins Hospital Reports, Vol. XIV. By HUGH H. YOUNG, M. D. The Johns Hopkins Press, 1906.

The bulk of the volume (484 pages) is given to the careful description of Young's operation of conservative perineal prostatectomy and contains a full history of each of the 145 cases operated upon up to the time the volume went to press. The unusual detail of the report has been rendered necessary by frequent misunderstanding of his method and by some criticisms not based upon a knowledge of the facts.

The author has taken the view that a full statement of his methods, supported by cases, is a more dignified answer to critics than to engage in controversy, and he has therefore avoided all comparisons as likely to be odious. The view seems to us an eminently sound one.

The first portion of the volume contains a description of the method which is essentially similar to that which has appeared in several articles published between 1903 and 1906 and need not therefore be reviewed here. The various steps are well explained and beautifully illustrated. Particular attention is paid to the method of attacking small, hard prostrate such as are described by Freyer as unsuited for prostatectomy.

His methods of dealing with the fibrous bar at the neck of the bladder, so frequently seen in these cases, and his sub-urethral enucleation of these strictures, are clever but will be found difficult.

The technique of bringing together the levator ani muscles so as to support the rectum and protect it from pressure by the gauze packing is fully described and constitutes an important addition to his original method. It is undoubtedly a most valuable aid in the avoidance of rectal fistulae.

Next in order he deals with complications occurring during convalescence and groups them under a variety of sub-headings.

The following list will give some idea of the comparative infrequency of serious complications:

Epididymitis occurred in 20 cases.
Suppuration occurred in 6 cases.
Post-operative hemorrhage occurred in 4 cases.
Urethral rectal fistulae occurred in 7 cases.
Phlebitis occurred in 2 cases.
Stricture of the urethra occurred in no cases.

The death rate in this series of 145 cases was 7 or $4^{8}/_{10}\%$. In a foot-note he adds that on Jan. 7, 1907, he had had 185 cases with 7 deaths, or a mortality of $3^{7}/_{10}\%$. In the last 100 cases the mortality was 2%. This is certainly an excellent showing and it is not reasonable to expect that any major operation can be done upon patients at this time of life with a lower death rate.

At the end of his article he presents a number of conclusions with some of which we are not fully in accord.

He says: "The ease of access to the prostate, the excellent view obtained, and the ability to use other instruments than the finger, make it the only reasonable method of attacking a nonenucleable fibrous prostate."

While for one as expert in the perineal route as the author this is doubtless sound, others have become hopelessly involved in the depths of the wound, have torn the rectum and the bladder and worst of all have failed to remove the obstruction. For those to whom the suprapubic route is more familiar, it will probably prove a safer direction of attack and by a dissecting operation it is quite possible to remove the prostate thoroughly by the upper route.

Later he says: "The absence of stricture and incontinence and also of rectal fistula (since its cause and remedy were discovered) show that they are bugaboos held out against a procedure by those who have never tried it."

This unfortunately cannot be admitted. Incontinence and rectal fistula have resulted in cases operated on by surgeons who intended to do Young's operation. It may probably be objected that they did not do his operation because they did not get his results, but the fact remains that these complications have occurred in the hands of those who have attempted to reproduce Dr. Young's results, and are likely to continue to occuer unless the operation be confined to those with more than ordinary familiarity with the neck of the bladder.

We must also take exception to the following: "The complete restoration of normal urination, except when some cystitis and vesical contracture was present, and the lasting results obtained testify to the completeness of the removal, except in the four cases given above in which the operator did not do what the cystoscope showed should be done, and are not to be placed against his method."

The author has fallen into the error of accepting the reports from patients as the gospel. In very few of his 145 cases does it appear that the amount of residual urine has been tested with the catheter at the time the final report was made. We must insist that nothing short of this searching test can be accepted as proof of cure, and though it is undoubtedly true that his cases are symptomatically well we do not think they can properly be said to be cured upon the evidence submitted.

Though we may differ from Young on minor questions, the work is clearly one of much importance. It is by far the most careful and complete contribution on the subject of perineal prostatectomy of which we have any knowledge.

The volume is particularly timely for comparison with the recent publication of an advocate of the suprapubic route.

Recto-Urethal Fistulae; Description of New Procedures for Their Prevention and Cure.

This article is a more detailed description of Young's method of preventing fistulae by protecting the rectal wall by suture of the levator ani muscles in front of it. The fact that since he has employed this technique fistulae have not occurred in his cases, is a convincing argument in its favor.

His only new suggestion for the cure of these fistulae beyond the above mentioned treatment of the muscles, is the preliminary creation of a suprapubic fistula, which, if our memory is correct, has been done before. This article might wisely have been included with the previous one where reference to it was made.

The Early Diagnosis and Radical Cure of Carcinoma of the Prostate.

This article is an elaboration of one which appeared in October, 1905, in which the author developed his technique for radical cure in these cases. In the present article the operation is essentially that previously suggested and the additions are largely in the careful report of additional cases of cancer of the prostate, which, though they bear upon the general question add but little to our knowledge of the possibility of radical cure by the method here proposed.

His proposition briefly stated is to remove the whole prostate with the cuff of the bladder and seminal vesicles, by a technique somewhat similar to his operation for prostatectomy. Though the method appears rather formidable the results seem to bear out his statement that it is less so than would appear. It of course leaves the patient with an absolute incontinence owing to the complete removal of both vesical sphincters and though it is doubtless true that this condition is much to be preferred to the alternative of leaving the malignant disease to run its course, it at once becomes incumbent upon him to show that radical cure is actually obtained by this method.

None of the cases which he reports are of sufficiently long standing to warrant the assumption that radical cure has been obtained. It is a matter of common knowledge that this disease progresses with unusual slowness and many surgeons have watched cases in which the disease had been accidently discovered and in which the progress was so slow that some years of comfort remained to the patient though no operation was undertaken.

Like all of Young's work in this region the technique is cleverly conceived and nicely worked out and the operation appears to be entirely feasible. It may, however, be doubted whether any local operation will result in radical cure, and until a sufficient time has elapsed to give us reliable data upon this point, no opinion upon the real value of the operation can be ventured.

Taking the volume as a whole and allowing for the fact already stated that excessive detail has been rendered necessary in order to answer critics, it is clearly a work of which the author may well be proud. If at times his enthusiasm has led him to expect more of the operation that it is certain to give in the hands of others, such enthusiasm is pardonable and may be likened to that of a parent for his child. The work places Young among the foremost of the productive genito-urinary men of his time.

HUGH CABOT.

Exploration de l'Appariel Urinaire. ·Par le Dr. Georges Luys. Paris, 1907. Masson et Cie.

The question of diagnosis of the diseases of the urogenital apparatus has become very greatly developed of late years, and a book pertaining to this subject, from the pen of an authority in the matter, like Dr. Luys, must cause much expectancy. In point of fact the author has presented the subject in as lucid and concise, at the same time complete, manner as could be well wished for.

Beginning with a chapter on the examination of the urethral secretions, one is led through the entire field of physical and mechanical exploration of the urogenital system.

The technique and instrumentation are most minutely dealt with, the text being illustrated by one hundred and sixty-five excellent figures and five very good colored plates.

Particular attention is to be called to the several chapters devoted to intravesical separation of the urine and to a short, but most important one, on the examination of the female bladder during pregnancy, with the direct cytoscope.

For the urologist, this book from the standpoint of the technique of diagnosis, could hardly be improved and is worthy of the highest praise.

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THE VALUE OF PALLIATIVE OPERATION FOR CANCER OF THE BLADDER.

By HUGH CABOT, M. D., Boston.

Of late years the attention of surgeons has been directed particularly to the possibility of radical cure of tumors of the bladder. By the timely and skillful use of the cystoscope these conditions are being diagnosed not only more frequently, but at an earlier stage in their growth, and the chance of radical cure, even of the most malignant varieties, has held out attractive possibilities. There are, however, a considerable group of cases in which it is evident at the time they present themselves that radical cure will be impossible, and the question arises in how far it is possible to alleviate the condition of these patients by operation. Should operation be proposed as a palliative measure, or would such attempts be likely to render the condition of the patient more deplorable? Although palliative operations for this condition have been done for a great many years, it seems as if the tendency of modern surgical opinion was against such interference. Many writers upon the subject of tumor of the bladder have failed to record their views upon this point, but there is a considerable mass of opinion accessible. In this paper I propose to show what this opinion is, and then to present some clinical evidence bearing upon the subject.

At the ninth session of the Association Française D'Urologie, in 1905, a very distinguished gathering of urologists discussed the subject of tumors of the bladder. In the course of this discussion many of them expressed their views upon palliative operation in malignant disease, and there was considerable unanimity in discouraging such attempts at relief.

Raffin, in a voluminous article upon which the discussion was based, referred to palliative operations as follows: "It is also necessary in order to estimate the value of palliative operations to take into consideration the relief of pain, and the improvement in general condition which destruction of the growth or physiologic side-tracking of the cancerous organ brings about. The benefit which the patient receives is, however, variable, and although most writers do not refer to the subject, it cannot be doubted that the condition of these patients with cancer is sometimes made worse by an attempt at a radical or by a palliative operation."

Weinrich of Berlin, in the discussion which followed, stated that Dr. Nitze at that time held the following opinion: "It is better to consider these malignant tumors as '*noli me tangere,*' since the patients who survive operation are not afterwards in a better condition than they were before."

Malherbe said: "Epithelioma of the bladder, when the diagnosis is clear and when the tumor has existed for some time, should not be operated upon except to check very serious hemorrhage or to relieve excessive pain."

Albarran said: "Palliative operation deliberately undertaken is indicated in very exceptional cases for hemorrhage, more frequently for infection of the bladder or for pain. According to the case, it is limited to a simple cystotomy or a curetting or a cauterization of the tumor. As a rule, I am becoming more and more conservative in fixing the indications for palliative operations."

Escat said: "I admit but one indication, pain. Hematuria is almost never immediately threatening in cancerous infiltration of the bladder. It can be mastered, as a rule, by the inlying catheter and aspiration of clots. The most painful form of death which menaces patients with cancer of the bladder is not hemorrhage, nor infection, nor cancerous cachexia, but, above all, a spreading of the cancer to the neighboring organs, or secondary cancer of the stomach, vertebral column, or intestines. I have seen some months and some weeks of general improvement due to drainage of the bladder, dearly bought by a perforation of the intestine and the passage of feces through the abdominal wound. Pain is the only indication which should force our hand. I have operated twice to relieve pain. In the first case I got a month of great improvement, but in the third month an enormous fungus developed at the neck of the wound, the tissue between the bladder and the intestine became gangrenous, and the pain was terrible. In another case I opened the cancerous bladder in a woman who had a dermoid cyst which had become cancerous and evacuated itself into the bladder. Here again, if the pain was in part reduced, the situation of the patient became more painful on account of the extention of the neoplasm to the abdominal wall and perforation of the intestine. I prefer to depend upon morphine alone as a palliative measure."

Legueu said: "Total removal of the tumor with resection of the bladder wall is, it must be confessed, very often impossible. The operation is therefore limited to a curetting. Is this operation necessary? I do not think so, and unless a severe hemorrhage immediately threatens life, I think it is wiser to abstain in the great majority of cases when one is quite sure that the tumor is malignant, has a wide base, and is therefore not radically removable. I have become less and less willing to interfere with cancer of the bladder."

Desnos said: "Intervention in this period (second period) is not, in my opinion, justified, except when life is in immediate danger from profuse hemorrhage, grave infection, or terrible pain. Are these symptoms always present in the second period? It is far from the rule. In most cases, hemorrhage is intermittent with considerable intervals showing that the disease is still there, but in the interval health remains perfect. This condition may last for a long time. I have seen several cases in which the local condition did not change in six or seven years, and in which the general health was little or not at all affected. Even better, there are occasional cases in which the tumor retrogrades and, whether on account of a spontaneous throwing off of pieces by the urethra or in a very gradual manner, the tumor slowly becomes reduced to a sort of stalk, which itself slowly disappears. It does not seem to me rational to operate on a tumor of which it is known that a complete removal is impossible, and of which the evolution on the other hand may be extremely slow and which may exist without interfering with the general condition, but the delay should be, so to speak, an armed one. The surgeon should be ready to act. The indication comes with an increase in frequency and amount of blood and in infection, and especially in pain, whatever the cause may be, whether referred to the abdominal wall or due to the existing cystitis. The operation, although palliative also, gives immediately good results by putting an end at once to pain. It may be possible to go further. By removing the tumor as completely as possible its progress is generally arrested and a recurrence may be postponed for some time.

" In the third period, when troublesome symptoms are menacing, it is also justifiable to operate, and the relief given to the patient may be considerable.

" Of course we are not talking of operating upon the patients in the extremes of cachexia, but it is possible to operate upon patients in a much exhausted condition, depressed by repeated hemorrhages, by severe pain or by infection of the bladder, even if this has extended to the upper urinary passages.

" I have myself been an actor in some true resurrections as a result of cystotomies done in these conditions. It is only necessary to compare the terrible pain caused by the cystitis of cancer with the peaceful condition which appears a few hours after an opening has been made in the bladder to be convinced upon this point.

" The operation properly done remains a purely palliative one, and consists practically in the opening, almost always suprapublic, of the bladder, the picking up of the bladder wall and its suture to the skin.

" The formation of this opening above the pubes is the operation. Of course if a surgeon finds projecting pieces or a pedunculated growth which can be easily removed, it is wise to relieve the bladder in this way, but to attempt to do a classical operation for removal of cancer of the bladder is to expose the patient to an improper risk.

" The suprapubic opening frees the bladder from its constant distention and allows the infected urine to flow out freely. An improvement in the condition of the upper urinary passage results, and restoration of the proper function of the bladder reacts upon the whole organism.

" The same is true of the local condition, and it seems as if the progress of the tumor was at times arrested, when not irritated by the constant retention and vesical infection. The phenomenon is comparable to the checking of the growth of cancer of the rectum after making an artificial anus.

"Hematuria frequently diminishes, although this is the symptom which seems to be least influenced by the cystotomy.

"This operation, to my mind, constitutes the great resource which we have to relieve these sufferers from new growths. It is above all an act of humanity. It prolongs life, but, above all, it gives their last days comfort, and frequently the suggestion that cure may result."

E. Hurry Fenwick, in his book on "Clinical Cystoscopy," in 1904, page 321, says: "A radical operation, or even a cystoscopy, should not be advised in any case in which an infiltration can be felt *per rectum;* all such cases to be left rigidly alone. If the patient suffers from the terrible distress of an occluded vesical orifice, then suprapubic drainage is the best that can be done. If the cystoscope shows evidences of sessile infiltrating growth or of sessile bald carcinoma, and yet no infiltration be felt by rectum or vagina, it is best, in my opinion, not to operate unless forced to do so in order to relieve blockage of the vesical orifice or to check dangerous hemorrhage."

These opinions are almost unanimously unfavorable, and though they may not truly represent modern surgical opinion, they cannot, on the other hand, be treated lightly, and must carry weight.

After considerable search I have only been able to find two opinions favorable to palliative operation.

Pasteau, in discussing the paper of Raffin, previously referred to, said: "In reference to sessile malignant tumors the prognosis is therefore much worse. Does that mean that they should not be operated upon? Evidently not. An operation wisely carried out and carried far enough, without pushing it too far, may be of benefit. Furthermore, even when all hope appears gone, when hemorrhage and infection have weakened the patient and made the end appear near, it is possible to postpone the fatal issue, to check the hemorrhage, to diminish pain, to improve the conditions due to infection, by drainage of the bladder by suprapubic route. I have reported two cases of my own. I could also report other observations on patients whom I have followed without having operated upon them myself. But one precaution is necessary. In these operations undertaken to save life, one must not be too radical. No attempt should be made at a radical removal of the tumor. The surgeon should know how to limit his operation. Cure is impossible. He should be content to open, drain, clean, and disinfect. In this way unhoped-for results may be obtained."

Keyes, in his "Text Book of Genito-Urinary Diseases," in the 1905 edition, said: "Palliative suprapubic cystotomy is the operation suited to all desperate and incurable cases. Even though no pretense is made of eradicating the disease, the patient's life is prolonged by the very fact that he is relieved of his worse symptoms. I have at present under my care a striking example of the value of this operation. Before operation the patient weighed 120 pounds, and was tortured day and night by insistent straining. Within six months after operation he gained twenty-five pounds, although the tumor, which was only curetted, was a typical villus carcinoma."

To these published opinions may be added the unpublished opinion of A. T. Cabot, "that palliative operation in cancer of the bladder may be of considerable benefit in relief of pain and prolongation of life," and the fact, of more value than any opinion, that he has for some years, and still is, operating upon many of these cases. Moreover, many general surgeons who see many of these cases in the course of years frequently do palliative operations and are satisfied that they are of value.

It is clear that the burden of proof in this matter rests upon those who would advise operation. They must show that the patient's condition can be distinctly improved, either by prolonging life with relief of symptoms, or by the relief of symptoms without any lengthening of existence. It would clearly be improper to advocate an operation which prolonged life unless the additional time was made reasonably comfortable.

Upon the basis of these indications palliative operation might be advised in two classes of cases:

I. Those in which it can be undertaken early, before infection has taken place or become important, and in which there is, therefore, the possibility of actually prolonging life.

II. Those undertaken after extensive infection has occurred and which must be regarded as purely for relief of symptoms.

CLASS I.

In these cases the attempt may be deliberately made to influence the course of the disease, though it is admitted at the outset that a radical cure is impossible. The belief that this may be done has apparently been based upon the well-known fact that cancer of the bladder grows slowly and metastases are slow in forming.

In how far such hopes are justified I shall attempt to show by the citation of cases, but wish, first, to outline briefly the method by which appropriate cases should be selected and the limitations which surround such an attempt.

Cases appropriate for early palliative operation should show the following favorable conditions:

I. The disease should be in a comparatively early stage, though the location or depth of infiltration make radical cure impossible.

II. Infection of the bladder must be absent or trivial.

III. Infection of the upper urinary tract must be absent.

IV. Cases in which the disease is known to have extended beyond the limits of the bladder and involved the lymphatic glands will not be benefited.

These limitations are necessary because in order to obtain reasonable benefit from operation beyond relief of urgent symptoms prompt closure of the wound must be obtained; for the creation of a fistula at this stage only makes the patient uncomfortable and is not indicated.

Very extensive involvement of the bladder wall, especially if the growth approaches the region through which the suprapubic wound is made and is complicated by infection, is very apt to make closure of the wound impossible. On the other hand, extensive involvement of the base of the bladder or a tumor of large size springing from a comparatively small base may be successfully dealt with.

Severe infection of the bladder, such as is frequently spoken of as a " dirty bladder," makes the closure of any wound slow, no matter for what purpose it is made, and it seems as if infection of this kind made the growth of the tumor more rapid.

Infection of the upper urinary tract makes the patient " a bad risk." This condition is often hard to demonstrate in the presence of bladder infection, but kidney pain, attacks of fever of irregular type and without symptoms, and dilatation of the ureter, as seen by the cystoscope when this is possible, are very suggestive.

While it is in many cases impossible to demonstrate with scientific accuracy that the tumor is or is not confined to the bladder, the occurrence of pain at more or less distant points, evidently due to pressure upon nerves, should be taken as a warning. Pain in the thigh, groin, hip, sciatic region, or upper part of the back is generally due to metastases with pressure upon the nerve trunks. Such pain will not be relieved by operating upon the bladder tumor, and the attempt will bring nothing but discredit upon the operation.

The limits of this paper are such that the methods of diagnosis of these conditions cannot be considered in detail. Careful physical examination, always including rectal palpation and cystoscopy, will enable the choice to be made, and we must insist that each case be studied separately, with a view to determining as accurately as possible the type of tumor, its extent, situation, and complications, not forgetting to estimate the general condition of the patient and his probable resistance to operative trauma.

CLASS 2.

By the previous division of the subject this class contains only those cases in which operation is undertaken purely for the relief of symptoms and not, as in Class 1, with the hope of influencing substantially the course of the disease. The operation is necessarily limited to simple cystotomy, and the end in view is to relieve the bladder of constant distention and contraction and put the parts at rest. The principal symptoms requiring this operation are pain, generally accompanying urination, excessive frequency, excessive hemorrhage, or severe infection. There are a certain number of cases which will fall between Class 1 and Class 2. In these it will clearly be impossible to influence essentially the course of the disease, and yet the symptoms are not such as to require immediate relief. Under these circumstances it is generally wiser to postpone operation until the symptoms are such as to require a permanent urinary fistula. It is at best a choice of evils.

Having thus briefly stated the limitations which seem to me necessarily surround our attempts to benefit these patients with cancer of the bladder, I submit the following cases as tending to throw light on the question.

My best thanks are due to Drs. M. H. Richardson, F. B. Harrington, S. J. Mixter, A. T. Cabot, and J. C. Warren, for permission to use their cases.

CASE I.—S. H. T., fifty-three, January 9, 1895; Dr. S. J. Mixter. Six years ago slight scalding and increased frequency of micturition. One year ago hematuria began, intermittent, not profuse, no clots. Some straining during micturition, worse when urine clear. Of late considerable blood clots. Frequency, every half-hour at night. No loss of flesh or strength.

Examination negative. Hematuria only abnormal condition.

January 11. Operation. Suprapubic cystotomy shows tumor as large as a mandarin orange, soft and friable, on the posterior wall. Tumor removed with forceps and curette. Bladder drained with rubber tubes.

Pathologist's report: Cancer.

February 1. Urine clear, wound nearly closed.

February 25. Wound closed; empties bladder freely.

April 30, 1896. Since leaving hospital has been constantly at work as a sea captain. Well until three months ago, when slight hematuria returned. At present time some suprapubic pain, slight burning, urine smoky.

May 6. Operation. Suprapubic cystotomy shows large papillomatous growth on the anterior wall. Removed with scissors and curette. Distinct infiltration of bladder wall.

Two days later gauze removed, catheter drainage substituted.

May 23. Wound closed.

June 9. Catheter removed. No leakage. Discharged.

June 23, 1897. Patient has been at sea since discharged. Slight hematuria returned five months after operation, but has not been troublesome. Now has occasional discomfort at neck of bladder, but is in excellent condition.

June 25. Suprapubic cystotomy shows a papillomatous growth projecting from the lower posterior wall. Removed with curette. Gauze packing to control hemorrhage. Gauze removed day following operation, suprapubic siphonage substituted.

July 1. Put on catheter drainage.

July 8. Urination every two to three hours. No leakage.

July 23. Wound entirely healed.

April 24, 1900. Much relieved by last operation. Last few months increasing frequency of urination and during the last few weeks has felt pressure on the diaphragm and difficulty in taking a long breath, occasional sharp pains through left side. Micturition every hour day and night. Urine smoky. Found to have a large cyst occupying greater part of the left side of abdomen. This was tapped under cocaine. Twelve pints of fluid removed. Proved to be an enormous hydronephrosis.

March, 1901. Re-enters hospital. Tumor has been tapped and refilled several times. Patient losing ground.

Died a few months later.

CASE 2.—J. D., aged fifty-eight; December, 1900; Dr. A. T. Cabot. Fifteen months ago said to have caught cold. Had a chill, with hematuria, which lasted three or four days. During the following eight months had a recurring hematuria every two to three weeks lasting two or three days.

Six months ago, urine clear, health excellent.

Five months ago recurrent hematuria, thick foul urine, chills.

Since that time has had many short attacks of hematuria, with intervals of health between. Urine has at times been clear. Last four weeks urine constantly bloody with clots. No frequency of micturition until last four weeks, during which time he has had frequency of every two hours in the day and three or four times at night. Two attacks of retention, apparently due to clots.

Examination negative, except for tenderness on deep pressure above the pubes and rectal examination, which shows prostate slightly enlarged and very hard. Urine constantly bloody. Examination of sediment shows cells which are thought to be from cancer.

January 3, 1901. Operation. Suprapubic cystotomy shows a soft papillary growth on the left side of the bladder on the posterior wall. Removed with forceps and base cauterized.

Infiltration of base not well marked. Bladder wound snugly closed around drainage tube.

Pathologist's report: Papillary cancer.

Urine clear shortly after operation. Wound closed in three weeks.

July 10, 1902. Urine clear until October, 1901, when hemorrhage returned. This, however, was not severe until within two months, when tenesmus has appeared and become severe. Pain shooting into legs troublesome.

July 18. Operation. Bladder holds six ounces. Suprapubic cystotomy shows bladder filled with large, irregular masses, largest on the left side. Masses removed with forceps and base cauterized. Bladder drained with tubes. Tenesmus relieved by operation. Pain in legs not relieved.

July 30. Pain in region of liver; no enlargement felt.

Patient returned home September 2 with suprapubic drainage through tubes connecting with the urinal, which kept him dry.

Died two months later.

CASE 3.—J. P. K., aged forty-nine; August 20, 1900; Dr. F. B. Harrington. Ten weeks ago first noticed blood in urine. Soon followed by some frequency and scalding Now excruciating pain and almost constant tenesmus. Passes very little at a time. Frequency almost every ten minutes. Rectal palpation negative. Cystoscope not used.

August 21. Operation. Suprapubic cystotomy shows bladder filled with material resembling old blood clots. Pedunculated friable tumor on base of bladder at left extremity of trigone. Base seized by clamp; removed with cutting forceps down to the base. Base cauterized. Bladder wall closed without drainage. Wound above left open and packed with gauze. Catheter drainage.

Pathologist's report: Villous carcinoma.

August 27. Urine free from blood. No leakage from wound.

September 9. Urination normal. Wound nearly closed. Urine only microscopically bloody.

This patient had a long interval of comfort. Entered City Hospital in January, 1902, died in February.

CASE 4.—E. N. E., age sixty-eight; April 30, 1905; Hugh Cabot. Patient of Dr. W. H. Sayward, Jr. Eight years ago slight attack of hematuria following exertion. Since that time two slight attacks. Neither of these troublesome.

During the last two years has had some nocturnal frequency. During the last year patient's family think he has been losing weight.

Two days ago, after a hard day's work, sudden, profuse, painless hematuria. Examination shows spare, pale man, with some shortness of breath. Marked arteriosclerosis, intermittent, irregular pulse. Urine bloody, containing many small clots. Prostate is small, not remarkable. Bladder wall above prostate does not feel indurated. Hematuria subsided in seven days, leaving some bladder irritability, with a constant feeling as if bladder was not empty.

May 19. Cystoscope shows a large villous growth filling base of bladder. Outlines not determined on account of bleeding.

May 22. Operation. Suprapubic cystotomy shows base and a considerable portion of posterior wall of bladder covered with a soft villous growth. This was thoroughly curetted and cauterized and the growth found to have extended somewhat in front of the urethra. Considerable infiltration of bladder wall.

Bladder wound closed snugly around rubber drainage tube with inversion (Gibson) stitch. Soft catheter in urethra.

Pathologist's report: Villous carcinoma.

Five days after operation urine clear. Suprapubic tube removed.

Three weeks after operation left hospital. Wound healed. Passes urine freely. Urine practically clear.

January 20, 1906. Dr. Sayward reports that patient is as well as he has been at any time during past two or three years. Urination about every two hours in the day, three or four hours at night. Urine is slightly cloudy, with microscopic blood, but no obvious hemorrhage. Hgb. 50%. Is able to do light work, though cardiac condition is troublesome.

July, 1906. Patient seen at office, on account of slight attack of hematuria the day before, which has now subsided. Patient thinks he is as well as he has been for some time. Is able to attend to his business.

November, 1906. Began to have slight continuous hematuria, with some obstruction to urination. No pain.

Patient died in March, 1907, the bladder wound having opened about a month previously, on account of increasing obstruction to the urethra. Last weeks were painless, and he did not require an opiate.

CASE 5.—J. H. L., aged sixty; July 16, 1902; Dr. Hugh Cabot. Two years ago began to have intermittent painless hematuria. Six months ago hematuria became continuous. Cystoscopy at that time by Dr. G. S. Whiteside showed a friable villous growth, size of a horse-chestnut, in region of right ureter. Operation advised and refused.

Hematuria has continued until the present time.

Bladder shows a residual of about four ounces. Examination negative except for bladder. Rectal examination shows prostate moderately enlarged, and above the prostate an indefinite thickening.

July 17. Operation. Suprapubic cystotomy shows a soft villous growth surrounding the neck of the bladder and extending up on to the posterior wall. Growth thoroughly curetted and found to infiltrate bladder wall in many places. Hemorrhage checked with cautery. Bladder closed snugly around rubber drainage tube, with inversion (Gibson) stitch.

Pathologist's report. Villous carcinoma.

Drainage tube removed on fourth day and catheter drainage substituted. Wound dry.

Discharged from hospital August 23. Urine clear. Uses catheter at night, for four ounces residual.

Urine remained clear until January, 1903. Patient was entirely comfortable. During the following months, intermittent hematuria returned; cachexia became marked.

Died in August, 1903.

CASE 6.—H. A. T., sixty-three. September 26, 1899. Dr. J. C. Warren. March, 1899, began to have hemorrhage from the bladder—not so severe as to keep him from work, until June 18. Since July 18 has been in bed. Hemorrhage every three days, on the average. Lasts four hours. Patient passes good-sized clots of blood, sufficient to obstruct the urethra. Has sudden stoppage urination; has discomfort, but no pain except on walking and driving. Jolting of any kind painful. Frequency of micturition amounts to several times at night. This has existed since before hematuria began.

Examination negative except that prostate thought to be enlarged.

October 2. Examination under ether. Prostate not enlarged. Portion of tumor removed with lithotrite.

October 11. Operation. Suprapubic cystotomy shows a growth on the right side of the bladder extending to and possibly involving the prostate. Growth curetted and cauterized.

Pathologist's report: Cancer.

October 28. Bladder wound closed.

November 9. Urine macroscopically normal. Patient free from pain and passing urine without difficulty.

Died two months later.

CASE 7.—J. L. Female. June 6, 1901. Dr. F. B. Harrington. Ten months ago some obstruction to and frequency of micturition. Eight months ago hematuria, which has been continuous. Rapid loss of weight and strength.

Vaginal examination shows a hard mass on anterior vaginal wall involving base and posterior wall of bladder.

June 6. Operation. Suprapubic cystotomy shows a large, irregular mass involving the base and posterior wall of the bladder. Projecting mass "bitten off." Base thoroughly curetted and cauterized. Bladder well closed without drainage.

Pathologist's report: Mesothelial cancer.

Patient much relieved by operation. Some sloughing of wound and leakage of urine.

June 28. Catheter out. Bladder wound healed.

August 4. Has gained much strength and is comfortable.

Died January 8, 1902, malignant disease of the bladder.

CASE 8.—N. W., forty. January 31, 1904. Dr. A. T. Cabot. Three and a half years ago hematuria. Ever since that time with short intermissions, urine has contained blood, at times in large quantities, at other times blood clots in clear urine. No pain except from passage of clots. Marked anemia, otherwise well.

Rectal examination shows a hard nodule in the prostate. Cystoscope shows a tumor on the right side of the bladder wall close to the prostate.

February 13. Operation. Suprapubic cystotomy shows a papillary tumor on the right base and anterior wall of the bladder. This was removed with forceps and curette and thoroughly cauterized. Bladder wall snugly closed about rubber tube.

Pathologist's report: Epithelioma.

Urine practically free from blood three days after operation.

February 28. Suprapubic tube removed to-day. Patient had chill, some fever, tenderness over left kidney. Put upon catheter drainage.

March 2. No leakage from wound.

March 11. Cystoscope shows site of tumor smooth, free from clots or mucus. About the right ureter is a red area of cicatricial tissue.

August 1, 1904. Well until five weeks ago, when severe pain in lower back appeared. Two weeks ago hematuria of moderate amount with few clots.

Rectal examination shows thickening above the prostate, particularly upon the left. Moderate pyrexia occasionally reaching 101.

August 15, 1904. Operation. Suprapubic cystotomy somewhat difficult on account of previous scar. Bladder wall studded with many hard nodules, with considerable infiltration of bladder wall especially marked on the right side of the bladder. Noules on the base of the bladder curetted and cauterized. Bladder wall closed without drainage. Abdominal incision drained with gauze. Urine following operation free from blood.

Died two months later.

The above cases are few in number, too few, in fact, to serve as a basis for dogmatic or positive deductions, but sufficient to form the basis of an opinion and to point the direction in which further study may be carried out.

Case 1 is clearly a brilliant result. Life was undoubtedly prolonged for five years, and made not only bearable, but comfortable.

In case 2 it seems fair to suppose that a year of reasonable comfort was added, and that the remaining time was made more bearable.

Case 3 was given at least a year of life, and possibly more.

Case 4 had more than a year of freedom from hematuria, and health as good as it had been for several years. At no time during the remainder of his life did he have any considerable amount of pain, and the patient, at least, was satisfied that the operation had been of great benefit.

Case 5 was given six months of freedom from hematuria, a condition which could not have been expected without operation, as the hemorrhage had been persistent for the previous six months. From the return of hemorrhage to his death, he suffered no considerable pain.

Case 6, though not a favorable case, was given a moderate interval of comfort apparently well worth having.

Case 7, though also an unfavorable case, was made comfortable and able to gain strength and definitely improve, though for a short time.

Case 8 had three months of comfort from the first operation, and some relief from the second—sufficient probably to justify the attempt.

In estimating the benefit which patients get from palliative operation, the element of encouragement due to disappearance of hematuria and relief of symptoms, is an important and in many cases, the most important relief given. If this can be done at the cost of an operation which does not add to the patient's discomfort, and does not confine him to bed for a long time, it may in itself be worth striving for.

The following cases are examples of failure to obtain any considerable relief owing to faulty selection of cases and lack of accurate knowledge of existing conditions.

Case 9.—E. B., fifty-seven. June 2, 1904. Dr. S. J. Mixter. Eight months ago frequency of micturition, three times at night. No pain or discomfort. One month ago pain in back and above groin, shooting to feet, kept him in bed for five days. Bladder obviously infected. Urine thick, cloudy, bloody. One week ago similar attack. Urination now very frequent, eight to ten times at night. No pain. Sudden stoppage of stream.

Two days ago acute retention. Bladder tumor, dull to percussion, extending nearly to umbilicus. Retention complete. Twenty ounces of urine drawn with disappearance of tumor. Rectal examination said to show great enlargement of left lobe, considerable of medium and right lobe of prostate. No tenderness.

Patient has shown some pyrexia, temperature frequently 100, once 102. Amount of urine varies from sixty to forty ounces.

Cystoscope thought to show malignant disease of prostate.

June 10. Operation. Suprapubic cystotomy shows bladder wall covered with villous nodules easily separated from the wall. Prostate moderately enlarged. Internal urethral orifice surrounded by growth which was easily scraped away. Growth not cauterized, not thoroughly curetted.

Pathologist's report: Cancer.

Following operation, bladder drained well by catheter. Temperature elevated, irregular. Amount of urine much diminished.

Died two weeks after operation, probably from pyelitis.

CASE 10.—J. P., thirty-five. June 12, 1905. Dr. Hugh Cabot. Two years ago, without obvious cause, began to have frequency of micturition amounting to every half hour during the day, every hour at night. Occasionally a few drops of blood at the end of micturition. At that time was treated by bladder irrigation with nearly complete relief of symptoms. Frequency entirely disappeared.

Four months ago, sudden, painless hematuria. Soon afterwards dull, aching pain in the outer side of both thighs, most marked upon the right and over coccyx.

Thinks he has lost twenty pounds in three months. No colic.

Examination shows a man who has apparently lost some weight.

Examination of abdomen negative except that lower border of liver is palpable.

Movements of hip joints, free, normal. Spine normal. Some tenderness over both sciatic nerves. Superficial and deep reflexes normal. No paralysis.

Rectal examination shows prostate normal, and an indefinite stiffening of base of bladder above prostate. Doubtful mass in region of bladder felt on bi-manual examination.

Cystoscopy shows large villous new growth.

June 16. Operation. Suprapubic cystotomy shows large villous growth which in places has infiltrated bladder wall. Short prolongation in front of urethra.

Surface of growth curetted down to the solid base which was then freely cauterized and bleeding entirely checked. Bladder wound closed by inversion (Gibson) stitch of plain catgut around a medium rubber drainage tube. Soft rubber catheter in urethra.

Pathologist's report: Cancer.

Four days after operation, urine clear, drainage tube removed. No leakage.

July 15. Patient emptying bladder completely without difficulty. Wound healed. Urine slightly turbid. Pain in thighs not relieved. Cachexia beginning to be marked.

Died three weeks later.

CASE 11.—C. S., seventy. February, 1896. Dr. A. T. Cabot. First symptom two years ago. Suprapubic pain.

In June, 1895, had a sharp hemorrhage from the bladder. None since. Pain deep in the perineum. For the last eight weeks micturition very painful and frequent. Has lost twenty pounds in last six weeks. Micturition every twenty minutes to half an hour, accompanied by extreme pain. Urine very foul.

Rectal examination shows slightly enlarged prostate, but is otherwise negative.

February 25, 1896. Operation. Suprapubic cystotomy shows a large sessile growth occupying the right side of the bladder. Carefully curetted without severe hemorrhage.

Tube drainage.

Pathologist's report: Flat cell carcinoma.

Operation did not greatly relieve pain.

Died in hospital four months later.

CASE 12.—E. B., fifty-eight. March 14, 1904. Dr. M. H. Richardson. One year ago severe pain lasting two weeks, during which time he passed gravel. Well until six weeks ago, when acute retention. Three weeks ago terrible pain on micturition, accompanied by free hemorrhage. Pain appears in rectum. Micturition every fifteen minutes.

Rectal examination shows great enlargement in the region of the prostate extending higher than the finger can reach. Some tenderness. Bladder holds but three ounces.

March 19. Operation. Suprapubic cystotomy shows bladder filled with blood clots and a sloughing mass on the right side of the bladder wall. This was partially removed. Not curetted or cauterized. Bladder drained with three gauze wicks and two rubber tubes.

Pathologist's report: Cancer.

April 15. Fresh blood in the urine. Suprapubic opening not closed.

May 17. Discharged. Suprapubic wound closed. Marked hematuria. Has to use catheter in order to irrigate bladder and get rid of clots.

July 11, 1904. Died of cancer of the bladder.

In Case 9 the death was probably due to a pyelitis. This might have been suspected on account of the moderate pyrexia before operation, though it was probably impossible to be sure of its existence. In any case the extent of the growth was such as to make it improbable that considerable improvement could be obtained by operation.

Case 10 shows clearly the unwisdom of operating upon cases in which pain is due to extension of the disease to the pelvic glands and in which the hematuria does not require immediate relief. Although the operation went smoothly, the wound closed without difficulty, and the bladder symptoms were relieved, the chief complaint—pain—was not notably affected, and there is no reason for supposing that the patient was benefited by the operation.

Case 11 is one in which the benefit following operation was less than might reasonably have been expected. The pain was apparently due to difficulty in emptying the bladder. It was not, however, relieved by operation. The age of the patient, and the size of the growth, was such as to render it a palliative operation at best. The benefit received was probably slight.

Case 12 is one in which it seems possible that more relief might have been obtained by a somewhat better technique. The early return of hemorrhage might perhaps have been avoided by a thorough curetting and cauterization. Earlier closure of the bladder wound would probably have followed had the drainage consisted of tubes alone rather than wicks.

PURELY PALLIATIVE OPERATIONS—(CLASS 2).

It does not seem necessary to consume time in quoting cases to show the benefit of operation undertaken purely for the relief of symptoms and consisting solely in a cystotomy. Several of the above cited cases obtained this benefit as well as others. No argument is required to show that when relief of pain can be obtained by a simple cystotomy, which may be done if desired, under cocaine anesthesia, the patient is entitled to it. To what extent operation is indicated for the relief of symptoms—hematuria—must remain a matter of opinion. While it is true that the hemorrhages are rarely fatal, and that in the majority of cases they stop without treatment, it should be borne in mind that hemorrhage from these tumors may in itself prove fatal or reduce the patient to such a condition that operation is deemed inadvisable. In the cases collected by Davis,[1] amounting to forty-one in all, there appear two cases in which hemorrhage had been allowed to continue until the operation was thought to be inadvisable and in both cases death followed.

CASE 13.—December 22, 1900. Man of sixty brought to Accident Room in extremely weak and anemic condition, with history of hematuria for six weeks. Has lost ground rapidly during the last three weeks.

Medical treatment of bladder failed to check hemorrhage and he died three weeks later.

Autopsy showed a papilloma of the bladder with a pedicle 1 cm. in diameter. There was no infiltration of the base or of bladder wall.

Except for the very marked anemia his condition was such that he would probably have withstood operation.

CASE 14.—June 8, 1901. Man of fifty-five. Has a congenital heart lesion. Painless hematuria began one and a half years ago.

For last three weeks hematuria constant. Bleeding continued while in the hospital, unaffected by medical treatment and he died one week later.

Autopsy showed a papilloma of the bladder, white, fibrous and shaggy, about 1½x1½ cm. Pedicle 7 mm. in diameter. Bladder full of blood clots. There was no infiltration of the bladder wall about the pedicle.

In spite of the condition of his heart he would probably have withstood operation, and the case was a favorable one for cure.

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[1] *Annals of Surgery*, April, 1906.

If such cases as these are likely to occur in four per cent. of the total number, the unwisdom of regarding hematuria as not in itself a dangerous symptom, becomes at once apparent.

Such an opinion, therefore, as that expressed by Escat must therefore be accepted with some caution remembering that in any individual case hemorrhage may be such as to prove fatal unless checked by operation.

TECHNIQUE

Before concluding the paper, a few suggestions may be made in regard to the technique of this kind of operation, especially in regard to the method of closure of the bladder wound and management of drainage.

As it is of the first importance to obtain early and prompt healing, those methods should be selected which are likely to give this result.

Dr. Harrington prefers immediate suture of the bladder wall with drainage of the overlying tissues (Cases 3 and 7.) A result quite as satisfactory may be obtained by the snug suture of the bladder wall around a medium-sized drainage tube by an inversion (Gibson) stitch. Wounds treated in this way have seemed to me to close quite as promptly as those treated by immediate suture, and perhaps expose the patient to somewhat less risk. Where this stitch is well executed and the bladder is drained by a catheter, when the suprapubic tube is removed, the amount of leakage is, as a rule, insignificant.

I have thought that prompt closure of the suprapubic wound was considerably aided by the use of the inlying catheter either from the start or from the time when the tube is removed. It has not appeared that the catheter irritated the bladder wall or conduced to bladder infection. The patients upon whom it has been used, have been comfortable, dry, and early out of bed. It seems a distinct addition to our technique.

The value of the cautery in the treatment of the base of cancerous tumors which have been removed by cutting or the curette has seemed considerable. It not only aids in checking the bleeding so that the bladder wound may be more completely closed, and the use of gauze packing dispensed with, but probably has a distinct effect in retarding the growth and giving a longer period of immunity. It is quite comparable to the excellent effects frequently seen following cauterization of superficial malignant growths. The Paquelin cautery is somewhat difficult to use in this situation, and is likely to singe the edges of the bladder wound to their disadvantage. If an electro cautery can be obtained, it is distinctly the instrument of choice.

CONCLUSIONS

It would have been an easy matter to add to the above cases others showing similar results, but this would have increased the bulk of the article without enhancing its value. The evidence submitted seems to me to show that real improvement in the condition of these patients may be obtained by operation. That bad results such as those mentioned by Escat, have followed operation, is not in itself sufficient to condemn it. The cases may have been unwisely selected, too radically dealt with, or, as seems most likely, represent the failures which are certain to occur in any attempt to stand off the progress of cancer. While they must be given due weight, they should not be allowed to befog the whole question.

The following conclusions are submitted:

1. That palliative operation is of value in the treatment of cancer of the bladder.
2. That in properly selected cases, operation will prolong comfortable existence very materially.
3. That suprapubic drainage of the bladder will relieve the symptoms and promote the comfort of patients for whom nothing more radical can be done.
4. That hemorrhage should not be allowed to continue unchecked unless efficient examination has conclusively shown that its cause cannot be removed by operation.

A NEW INSTRUMENT DESIGNED TO MEASURE THE THICKNESS OF THE PROSTATE GLAND.

By GEORGE WALKER, M. D., Baltimore, Md.

THE accompanying cut represents an instrument which can be employed to measure the thickness of the prostate gland along the urethra, or to determine the presence or absence of a middle lobe.

It consists of two parts. The outer portion (female blade) is made in the form of a hollow tube, with a slot on the under surface; its distal end is curved, as shown in the cut; at the beginning of this curve there is a pocket for the reception of the knob on the other blade; the proximal end is attached to a circular corrugated handle. The other part (the male blade) is a solid circular piece; it has a flat-shaped knob on the distal end, and a scale on the proximal portion; the extreme end of this portion is covered by a flat cap.

Mode of Use.—The instrument is introduced into the bladder and turned so that the concave surface rests on the middle portion of the posterior wall of the internal urethral orifice. The finger is then introduced into the rectum, and the tip placed at the lower border of the prostate gland at the juncture of the urethra. The handle of the instrument is held steady by the left hand while an assistant pulls out the female blade until the tip of the finger in the rectum feels the approach of the knob passing along the urethra. The distance which the blade has been pulled out, as shown on the scale, represents the thickness of the gland. The presence of a middle lobe is determined by taking three measure-

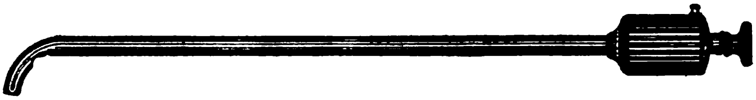


FIG. 1.

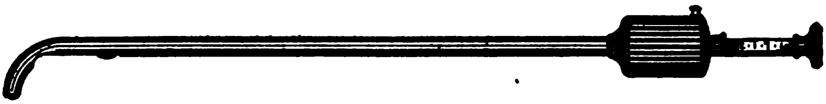


FIG. 2.

ments: First, one in the middle, in which it is aimed to place the beak of the instrument over the center of the middle lobe; the male blade is then pulled out as described, and a measurement taken. The instrument is then closed and the beak turned slightly to one side and pulled very gently. In this way it is made to slip off the middle lobe and pass down the side into a groove at the base. A measurement is then taken. A similar measurement is made for the other side, and the results are then compared. The difference between the middle measurement and the two lateral ones, represents the height of the middle lobe.

This instrument will be found useful before undertaking a Bottini operation, in that it indicates how long the cuts can be made. And to those not experienced in the use of the cystoscope, it will give an approximate idea of the contour of the internal urethral orifice.

A SIMPLE AND INEXPENSIVE COMPRESSION CYLINDER FOR RADIOGRAPHING KIDNEY STONES.

By JOHN R. WATHEN, A. B., M. D., Lousiville, Ky.

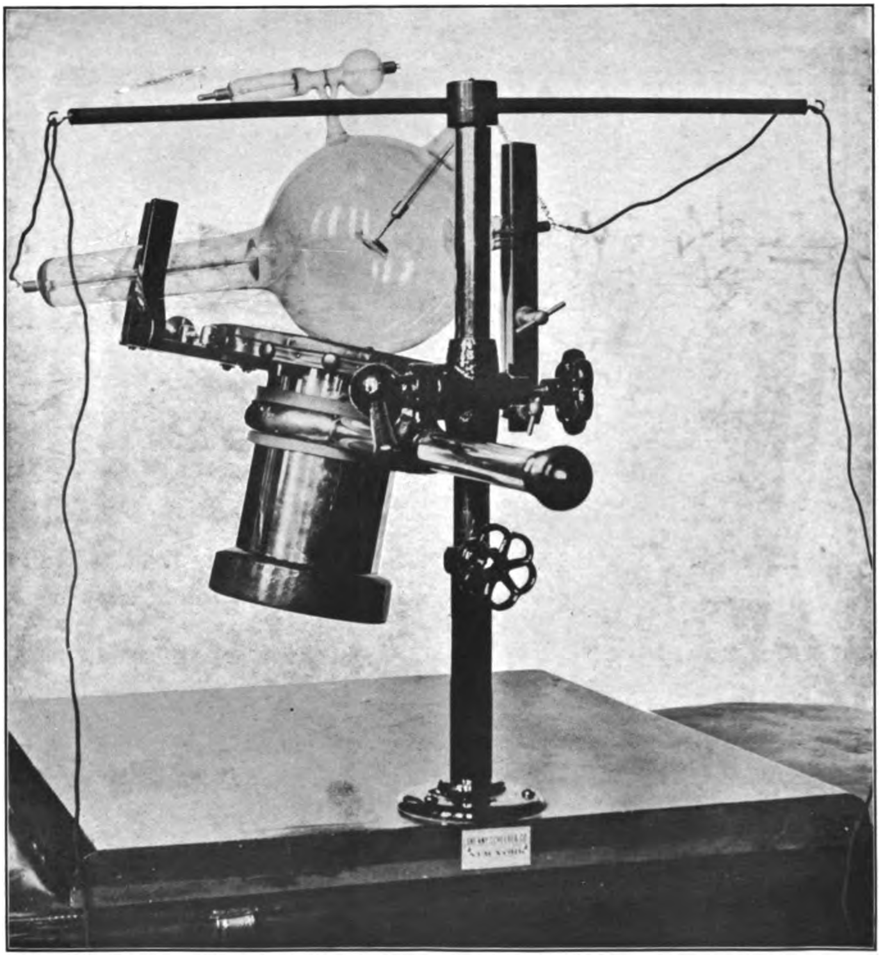
THE apparatus which I herewith present, is a modification of the original Kompressionsblende of Dr. Albers-Schönberg. The original machine needs no endorsement as to its efficiency in diagnosis of calculi in the kidney, ureter or bladder, as we have all to-day realized that by the method of compression, we not only fix the part, but lessen to some extent the distance through which the rays have to pass, and by means of the lead cylinder and diaphragm, we are able to exclude all the rays except those which emanate directly from the annode and produce the clearest pictures, with little tendency towards fogging of the photographic plate.

The original machine as manufactured by Siemens & Halske of Berlin, and various modifications, as the Hulst machine and others, are all so expensive and complicated as to offer many objections to their use.

The machine I have devised has the following advantages:

1. The machine is quite inexpensive.
2. All the adjustments are made from one upright with a universal joint, and made on one side of the patient.

PLATE III—To Illustrate the Article by Dr. John R. Wathen.



THE AMERICAN JOURNAL OF UROLOGY, September, 1907.

3. The machine can be placed under the patient while he is still upon the table, and adjusted to any part of the body.

4. The machine is so arranged that the metal parts do not come near enough to the terminals of the tube so there can be any possibility of drawing sparks to the machine, and thus the liability of frightening the patient.

The machine is constructed in the following manner: A base-board 2 ft. square and 1½ in. thick, is made of three layers of hard wood, to prevent warping. In the middle of one side of this board there is erected an upright steel tube, which can be removed at will, and to this upright tube there is attached a universal joint which allows of movement in any and all directions, and at the same time the metal is made to allow it to be clamped with great rigidity and exert sufficient compression. Instead of making the cylinder lead-lined, it is made of thin brass with a large wooden flange at the base, to insulate the patient. The tube-platform is made of wood, upon which is spread a layer of white lead and putty, making it thoroughly opaque to the rays, and a non-conductor, and through the center of this a 2-in. opening. Over this platform, upholstered leather is used, and the tube rests upon this platform. The tube is held in place at any angle by universal adjusting joints, and is so constructed as to be self-centering.

The wires are spread apart by an attachment placed at the top of the steel upright. The thumb-screws are so placed about the machine that any and every possible adjustment can be made at a moment's notice, and the tube or cylinder can be placed in every angle and position.

There are only two points where sparks can pass. One is on the tube spark-gap, and the other, the parallel spark-gap used on the coil, and in this way no short-circuits to the patients occur, nor is it needed in any way to ground the machine.

I have been indebted to Dr. Carl Beck of New York, for my ideas of simplicity in construction, and while his cylinder is capable of doing good work, I believe this will accomplish all that is claimed for the original German model, with none of its disadvantages, and with many points of superiority.

I present this machine, believing that there is a demand for such, as all the other apparatus has been either too complicated or too expensive.

EDITORIALS.

THE COMPLICATIONS OF MOVABLE KIDNEY.

AMONG the complications of movable kidney there is one of great interest, where the question of prognosis and also the treatment should be considered; we refer to non-specific infection or pyelonephritis. This diagnosis at once causes fear in the mind of the surgeon. The urine has only been slightly turbid, when suddenly the temperature rises to 40° or 40.5 C., often accompanied with a sharp pain in the right side. By palpation, if the patient can stand it, behind the contracted muscles, a greatly enlarged and painful kidney can be made out, but, after a few days, the patient returns to a normal condition; still the urine remains cloudy and, as Legueu has said, a similar attack is always to be feared until an operation has been undertaken during the interval of the attacks, this being nephrorraphy with decapsulation, which produces a natural drainage of the kidney and does away with any future attack.

After pyelonephritis, as a complication of movable kidney, comes the so-called intermittent hydronephrosis, which makes itself evident by violent pains in the side under the false ribs, and when on the right, usually below the gall bladder and extending toward the bladder and inguinal region. Micturition becomes painful and the amount of urine voided is diminished. The general symptoms become worse, the patient's face being pinched, the pulse is small and rapid, and vomiting then takes place. When there is concomitant infection the temperature may reach 41° C., but it is of short duration and disappears with the pain. As in the case of infection, the kidney will be found enlarged, the organ being very painful on palpation and accompanied with muscular rigidity. The attack lasts anywhere from a few hours to a few days, then the pain quiets down, and exploration being easier, allows one to feel the kidney still enlarged. Soon an intense polyuria arises and the renal tumor decreases in size. For a few days the renal region will remain painful and doughy; then all these clinical manifestations disappear and the patient will be well until another attack occurs. Fatigue, muscular efforts, moral emotions, and coughing fits appear to favor the return of the accidents. The latter are due to renal retention arising from a bend in the ureter, whether this be temporary or permanent, while in certain cases a congenital lesion of the ureter may be discovered.

Other complications have been met with, but, in spite of the considerable authority of Edebohls, we believe that appendicitis can hardly be considered a complication of movable kidney. Appendicitis is a very frequent affection, while the same may certainly be said of movable kidney, and it is not at all surprising that the two affections may frequently be present in the same subject.

Albuminuria may be met with, and, out of one hundred cases, Hibert found nine instances of slight albuminuria, while five other cases of movable kidney had marked albuminuria.

It should also be borne in mind that the renal mobility in no way necessarily gives rise to any pathologic change in the renal gland involved, and a movable kidney does not appear to present more lesions than its mate in the vast majority of cases.

Hematuria has been met with. The renal congestion produced by the mobility of the kidney and torsion of its pedicle are, without doubt, the cause of this complication. In some cases, however, the bleeding may be attributed to a nephritis, as has been pointed out by Newman, but this lesion need not of necessity exist, because an intermittent hydronephrosis may give rise to hematuria. Let us add that neoplasms, usually of a malignant type, may develop in movable kidneys, and Legueu has met with a case of cystic cancer in one case. It should be recalled that the diagnosis is not always an easy matter.

The same may be said of tuberculosis, and cases are on record where tuberculous cavities have invaded à kidney affected with intermittent hydronephrosis. Occasionally tuberculosis gives rise to a perinephritis, with the result that the kidney becomes fixed in an abnormal position.

One of the complications mentioned not infrequently may give rise to an erroneous diagnosis; we refer to intermittent hydronephrosis. During the attack the sharp pain in the side may lead one to suspect an attack of appendicitis, or nephritic colic. In hydronephrosis, and quite contrary to appendicitis, the localization of the pain is high, while it extends down the ureters toward the bladder, and there is oliguria and some pain on micturition. Then, again, the general symptoms are far less marked than in appendicitis and all reaction on the part of the peritoneum is wanting. The question of a differential diagnosis between intermittent hydronephrosis and nephritic colic need not be discussed, because one is in reality dealing with renal colic produced in this case by the hydronephrosis itself and not by a calculus. The differentiation of the attacks in these types is made more particularly by other symptoms than the pain. The age of the patient, the sex, the repetition of the attacks, the absence of hematuria, and the discovery of a movable kidney between the attacks will allow one to come to a correct conclusion.

During the interval of the attacks one may suspect an hepatic colic all the more easily, because icterus which follows the passage of gall stones may also follow in the wake of a right-sided hydronephrosis, this being due to compression of the choledochus. Ureteral catheterism, by demonstrating the reality of the renal retention during the interval of the attacks, alone allows one to make a correct diagnosis in certain cases presenting unusual difficulties.

THE PATHOGENESIS OF ARTHRITIDES AND PSEUDO-RHEUMATISM, COMPLICATING AFFECTIONS OF THE UROGENITAL APPARATUS.

FROM a study of recorded cases, it would seem to result that the arthritides encountered during the progress of diseases of the genito-urinary system may affect the most varied forms, from simple hydarthrosis to true purulent athritis. One might, perhaps, as Widal has done for gonorrheal rheumatism, describe six forms of these joint manifectations, viz.: the arthralgic, hydropic, sub-acute polyarthritis, ankylosing monoarthritis, purulent arthritis, and progressive deforming polyarthritis; but such a classification is, we believe, fastidious, because it does not agree absolutely with the results of the clinic. We believe that it is more in conformity with facts obtained by observation, as well as the pathogenesis, to simply distinguish the attenuated types and the purulent forms, if one differentiates them by their symptoms; while if they are considered merely from their pathogenic agent, one may admit a colon bacillus, streptococcic, and tuberculous type.

The purulent types and the attenuated forms include the entire ensemble of all varieties of infectious arthritides that can be encountered in practice. The former are accompanied by serious general phenomena with the presence of pus in the joint, while the latter develop slowly, without, or nearly without, pain, and with or without the presence of serum in the joint.

Bacteriologic researches recently undertaken and pertaining particularly to the study of the soluble products secreted by bacteria, have resulted in a fairly good knowledge of their action, and from this a direct application to serotherapy has been made. The fact upon which it is based is the decrease in the virulence of these toxins by means of experiments, that aided by observation, have solidly established, and which each day become broader in their devolopment.

The injurious action of microbic toxins is distinct, but considerably less intense, under the same conditions, than that of the bacteria having secreted them, and, in point of fact, it has been recognized experimentally that an injection of filtered cultures always produces much less acute reactional phenomena than those set up by pure cultures of the same pathogenic agents.

On the other hand, we know at the present time that the joint complications under consideration may be determined in two ways, viz.: by the direct action of the bacteria, or by the toxins secreted by them. Given the difference in intensity presented by the reactional symptoms in the two types considered, one may well ask if this difference is not due to an alternative action of these two manners of joint infection. Basing ourselves upon the results of experimentation, we believe we are authorized to assume that the serious acute forms are due to a true blood infection, and that the bacteria act directly in these cases. And in point of fact, it is in the acute cases that their presence in the blood has been frequently demonstrated.

On the contrary, the attenuated types of arthritides complicating genito-urinary affections are probably due to the entrance into the economy of the soluble products secreted by the bacteria localized in the existing lesion of the urogenital apparatus, whether absorption takes place at one time or in series. Their effects are slighter and they only have a temporary deleterious action, because the general condition rapidly improves. They probably act on the tissues by modifying their chemical make-up and provoke vaso-motor phenomena, giving rise to serous collections in the joints, and, unless endowed with a high degree of toxicity, they hardly, if ever, give rise to a suppurative process.

However, one should not establish between the benign and suppurative types of arthritides an impregnable barrier, because urinary toxemia and infection are intimately united, the former preparing the soil for the second, while the latter acts reciprocally by the intermediary of the former. And, for that matter, how can be explained the early appearance of febrile disturbances and their short duration in the acute forms, if one does not admit the action of the toxins secreted by the bacteria themselves? The animated agents and their soluble products are of necessity united; their effects only differ by the predominance of one mode of action over the other. In certain cases the localization occurs in the joints, but the bacteria, like the toxins, may act on any other part of the body, giving rise to a particular form of infectious rheumatism, viz., the abarticular type. This is met with in gonorrheal rheumatism, in some cases of which involvement of the lymph nodes has been noted by Chauffard and Ramon. In the case of puerperal rheumatism, Tridoulet and Thomas have described meningo-medullary lesions. And, lastly, there is an undoubted type of tuberculous rheumatism, proven by Poncet, by the demonstration of its frequent localizations in the heart and the meninges.

It, therefore, would seem seasonable to suppose that the same applies to infectious urinary rheumatism, and Trossat has recorded a case where fever occurred after catheterism in a patient having a gonorrheal stricture, soon to be followed by an eruption over the region of the great trochanter and pubis; this was first purpuric, then phlyctenoid, finally papular, continuing to suppuration. This eruption had all the characters of a polymorphous erythema of the skin, whose resemblance was very great with cutaneous manifestations of acute articular rheumatism.

Thus, in a general way, it is seen that all bacteria act in a similar way; at least this may be so assumed, but their different properties give special characters to the pathologic manifestations that they determine, frequently with an evolution entirely of their own and well-defined local symptoms. If a single one of these agents was the initial factor of all infectious rheumatisms having a genito-urinary origin, we could establish, given the properties that it possesses, the train of symptoms with which these manifestations would always appear. Unfortunately this is not the case, and the very diversity of the bacteria encountered in the urethra and bladder oblige one to consider, in each particular case, the nature and the characters of the determining cause. The colon bacillus and the streptococcus do not act in the same way; one is more virulent than the other, producing a more intense and generalized infection.

Consequently, in order to give a detailed study to each of these types of urinary pseudo-rheumatism, it would be necessary, for example, to describe that produced by the streptococcus, or pyemic pseudo-rheumatism, and that specially produced by the colon bacillus; and beside these, one will have all the varieties that the specific bacteria, also encountered in the bladder, can produce. One should recall to mind the pathogenesis of gonorrheal pseudo-rheumatism, and also Poncet's researches, in order to establish a class of tuberculous pseudo-rheumatism having the urogenital apparatus as its origin. And all this is not merely an hypothesis, because such instances have been recorded from the Lyons School. And even here this study would not be terminated, because there would still remain all the joint types of these various infectious rheumatisms.

In conclusion, it may be said that, given the great diversity of pseudo-rheumatisms, as well as the influence that they are subjected to in their forms on account of the variety of pathogenic agents giving rise to them, it is, perhaps, an easier matter, in classifying them, to simply consider their clinical characters rather than the concomitant disease. However, it must be pointed out that every classification should be based as much as possible on the pathogenesis of the phenomena, and, unfortunately, many of these pseudo-rheumatisms are possessed with an obscure etiology. But scientific researches will sooner or later fill this lapse, and then a pathogenic classification may be made applicable to all the forms and varieties of infectious pseudo-rheumatisms.

THE DIAGNOSIS OF RENAL LITHIASIS.

RENAL lithiasis is not always easy to diagnosticate. Elementary as it is to recognize typical forms, the contrary is absolutely true in the atypical forms, so that the problem of diagnosis becomes complex and many difficulties are encountered. Besides those cases where the calculus may remain absolutely latent, there are others in which the clinical evolution loses its distinctness, so that, unless a careful examination is made, the physician may overlook the lithiasis and locate the cause of the accidents in some other organ.

Léon Sourdille, in a recent work containing important statistics, places in evidence the possible anomalies and compares the knowledge which may be furnished by modern means of investigation, such as ureteral catheterism and radiography. There is one important fact which is made evident in this work, viz.: That the only pathognomonic sign of renal lithiasis is the presence of calculous débris voided by micturition; in other words, one is led to infer that renal pain and nephritic colic have nothing characteristic. Now, all this is quite true, because certain pains experienced by patients afflicted with renal calculus, those, for example, which occur without any apparent cause and persist continuously, appear more probably due to renal congestion than to the lithiasis itself; the characteristic pains of lithiasis undergo an evolution following the intermittent type, and still more, they are provoked by movement. It is also to renal congestion that spontaneous and continued hematuria should be attributed.

In certain forms, the pains in renal calculus become almost exclusively localized in the genital sphere, and from this fact many possible errors can arise. For instance, a patient is suddenly taken with a pain in the testicle, often so acute that it may produce syncope. The testicles increase in size, likewise the epididymis, while pressure will awaken the painful phenomena. The patient's general condition is poor, a slight elevation in temperature occurs, accompanied by digestive disturbances, while the urine is dark-colored or reddish. No trace of gonococcic infection of the urethra is present, so that this form of orchitis cannot be baptized, and the diagnosis remains faltering until a calculus is expelled per urethram.

In other cases digestive disturbances predominate, and nausea and vomiting are foremost among all. These digestive accidents may exist in nephritic colic, as well as in the chronic forms of renal lithiasis. Sourdille records cases where chronic lithiasis was the cause of nausea, vomiting, attacks of gastralgia, icterus, or even splenic pain. Consequently, when in presence of abdominal disturbances, whose cause escapes a careful examination, one should recall the possibility of renal lithiasis, and very frequently a search made for renal pain, an attentive palpation of the ureter, with a microscopical and macroscopical examination of the urine, which will show the presence of blood to simple inspection or only red blood cells by the microscope, or merely an increase of uric acid in the urine, will allow one to come to the correct conclusion as to the cause of the symptoms.

Cystoscopy and ureteral catheterism may render great service. The ureteral orifice on the side of the lithiasis in migration may be injected, while the urine coming from it contains a more or less considerable quantity of red blood cells. But catheterism, oftentimes difficult to effect, is far from being a resource offered to the surgeon in general practice on account of the delicacy of its technique, and for this reason radiography will be found more useful, at least in certain chronic lithiases, because the calculus may be seen and its exact location discovered. However, it should be recalled that all calculi are not impermeable to the X-rays, as they will not show stones composed of uric acid or the urates in a pure state. Consequently no conclusion should be drawn if the result is negative, but, on the other hand, a positive result is conclusive, and not only settles the diagnosis, but also guides the surgeon's hand.

THE TREATMENT OF HEMATURIA.

HEMATURIA, having a renal origin, may occur in other infectious diseases besides scarlet fever. It has been encountered in influenza, likewise in typhoid fever. In the latter affection, it ordinarily occurs only after the disease has reached its maximum, that is to say, toward the end of the second week. The hematuria is frequently associated with other hemorrhages and frequently culminates in uremia.

In infectious diseases, hematuria is not very abundant and requires no special treatment. In typhoid fever the albuminuria, or even typhoid nephritis, are not contra-indications to the use of cold baths, frequently required in the treatment of this disease. However, should a hematuria occur, it would be wiser to increase the temperature of the baths as long as this symptom is present. Dry cupping over the kidneys should be resorted to where uremia appears to be developing.

Other causes of renal hematuria are also to be considered, such as traumatism, pyelitis, calculus, pyelonephritis, tuberculosis, renal lithiasis without any inflammatory process, renal neoplasms, movable kidney, and hemorrhagic uronephrosis, these being of far greater interest to the urologists.

A slight renal contusion may possibly be recovered from by rest, small doses of morphine, dry-cupping over the kidneys, and compression of the lumbar region by a flannel band. However, medical treatment is frequently insufficient, and when the hematuria persists, surgical interference is indicated. Nephrotomy should be resorted to, and, should the condition of the kidney justify it, nephrectomy may be imperative.

Pyelitis following surgical or medical infections, catheterization, and so forth, is rapidly recognized by the amount of pus which accompanies the hematuria, as well as a rise in temperature and so forth. There may, or may not, be distension of the kidney. A milk diet, diuretic drinks, and certain mild mineral waters, particularly those of Evian or Contrexéville, frequently produce excellent results in cases of pyelitis where distension is of slight amount. From this point of view let us refer to the usually favorable prognosis of pyelitis following pregnancy, and out of a total of seventy cases published in 1904 in the *Journal des Praticiens,* there was not a single death.

Let us recall an excellent means of emptying the kidney after the hematuria has ceased. It consists in distension of the bladder with from 150 to 160 cc. of a solution of boracic acid, which, by the reflex action it causes in the kidney, would seem to result in an increase in the contractility of the excretory apparatus of the gland. Generally speaking, hematuria arising in pyelitis is mild and rarely becomes marked, unless complicated with a secondary formation of calculi.

A favorable prognosis may frequently be given in hematuria due to pyelitis of movable kidney. This is a fact having a very great practical importance, and upon which the text-books say little. Women possessed of movable kidney have pus in the urine, a rise in temperature and hematuria. With a few days of rest and a great reduction in the amount of liquid taken in twenty-four hours, the symptoms subside and the patient may remain in good health for a number of years. However, it is evident that surgical interference is decidedly indicated and should be resorted to without delay if the symptoms persist. It is well, however, not to interfere during an acute period, and it is wiser to abstain surgically until the inflammatory phenomena have subsided. The persistency of a rise in temperature, renal distension, and a feeling of general weakness, are indications favoring operative interference, which, according to the case, should be nephropexy or capsulectomy.

The hematuria of renal lithiasis or pyelitis from cantharides requires no other treatment in the beginning than rest in bed and a milk diet. Later on the X-ray will confirm the hypothesis of calculus and nephrolithotomy will then be resorted to. The same does not hold good for the remaining two types of hematuria, whose diagnosis is frequently most singularly doubtful; we refer to hematuria from renal neoplasms and that from tuberculosis of the kidney. In the former, besides an increase in the size of the gland, recognized by bimanual palpation, and, perhaps, with the co-existence of a symptomatic varicocele, an insidious commencement is noted, with intermittent hematuria or a continuous loss of blood, which is in no way influenced either by rest or movement; a completely painless emission, a uniform coloring of the urine, which is red, both at the commencement and at the end of micturition. Guyon has termed this form of hematuria *total,* in opposition to initial or terminal hematuria, where the blood is only found at the beginning or at the end of micturition, or, on the other hand, when it is more abundant at this time, a condition which is more particularly encountered in hematuria arising from either the bladder or the prostate.

The clinical procedure of the simplest order by which the various differences in the color of the urine may be appreciated is to have the patient pass his urine into two or three glasses. In the first he should only emit the first few drops of urine, while in the second glass the largest amount should be passed, and in the third merely the remaining few drops remaining in the bladder. Occasionally the urine will contain clots, whose shape will indicate their origin, and when they are from twenty centimetres in length or more, giving the exact mold of the ureter, they have a very great importance when a differentiation between a vesical or renal tumor is to be made.

However, the diagnosis of renal hematuria does not only indicate a neoplasm. It may also be a prominent symptom of renal tuberculosis, but here, generally speaking, the pus and cloudy urine present during the interval between the occurrence of the hematuria is significant. Besides, the bacillus of Koch may be detected; but the best procedure is to inoculate a guinea pig, which may be killed a few weeks later.

When the tuberculous process is purely cortical, the central portions of the kidney are not involved, so that when a hematuria is not going on the urine may retain all its normal characteristics. Under these circumstances the kidney is only slightly or not at all enlarged, and never will be found possessing the size attained by renal neoplasms. The discovery of tuberculous lesions in other viscera, and especially the general aspect of the patient, will aid greatly in the diagnosis. However, a considerably enlarged kidney does not necessarily mean that the process is not tuberculous, because certain instances of tuberculosis having a cortical origin may increase the size of the kidney considerably, although the pelvis of the organ may not be involved. On the other hand, the bladder remains intact nearly always in cases of renal neoplasm; while, on the contrary, in tuberculosis, a primary or secondary cystitis is nearly always present.

As to hematuria arising from the presence of calculi, it is generally small in amount, accompanied with pain, and is usually produced by movement, while a history of previous nephritic colic will enlighten the diagnosis. It, however, should be recalled that calculi and a neoplasm may evolute together, and, although this is infrequent, instances have been recorded.

Uronephrosis may also give rise to hematuria and lead to an erroneous diagnosis of renal neoplasm. Albarran has collected twelve instances of this kind, and, in one of his own cases, that of a non-calculous uronephrosis, the hematuria was sufficient in amount so as to be mistaken for a neoplastic hematuria. Exploratory nephtotomy made the diagnosis clear.

The treatment of all these types of hematuria is above all surgical. The administration of calcium chloride, rest in bed, and a strict milk diet sums up the medical treatment. Operative interference in cases of renal neoplasm has given very excellent results, and the lease of life has been long. The same may be said in renal tuberculosis when the process is localized, and nephrotomy or nephrectomy have occasionally resulted in real resurrections.

However, surgical interference rests entirely upon the diagnosis of disease in one gland only, and at the present time, with our modern instrumentation and technique, this can readily be ascertained.

Hematuria arising in general diseases should be considered. We have already referred to the hematuria produced during the progress of infectious nephritis occurring in general diseases, but there still remains a certain number of forms of hematuria depending upon scurvy, hemophilia, purpura, hemorrhagic disease and leucemia.

The hematuria of scurvy should be treated by the administration of fresh fruit and vegetables. In a case of hemophilia having a most obscure cause and giving rise to abundant hematuria and pains in the joints, due, without doubt, to an intra-articular collection of blood, quinine sulphate, fifty centigrams daily, and sodium sulphate, at the dose of one gram daily, divided into ten powders, appeared to have a good effect. Sodium sulphate has been employed in Germany for hemophilia, and has also been recommended by Reverdin at the dose of ten centigrams taken every hour in cases of serious, spontaneous, or chromatic capillary hemorrhage. Since, however, the therapeutical value of chloride of calcium has been established, the above-mentioned remedies have lost their favor. Calcium chloride should be administered at the dose of from two to four grams in twenty-four hours.

Hypodermic injections of gelatine serum have also given satisfactory results in both hemophilia and purpura. Other remedies, such as ergot, tannic acid, ferri chloride, etc., do not appear to have any very favorable action over hematuria, no matter what its cause may be. In a case of hemorrhagic purpura Dieulafoy obtained good results from adrenalin, which completely controlled a hematuria arising during the process.

Hemorrhagic disease of the newly born should be treated by salt solution injections, but calcium chloride, being a milk coagulater, cannot be used.

Hematuria arising in leucemia can only be controlled by quinine and calcium chloride, but it should not be forgotten that the best treatment for this affection is still Fowler's solution in large doses.

It should also be pointed out that the use of the X-ray may occasionally increase the efficacy of the arsenic.

THE SYMPTOMS AND TREATMENT OF PYELONEPHRITIS OF PREGNANCY.

PYELONEPHRITIS of pregnancy is met with in several forms, viz.—the acute and latent. In the latter case the patient merely complains of indefinite pains, but pus is passed in the urine; there is no elevation in temperature and the subject may continue her occupations. In the acute forms, the onset is sudden; there is cystitis and a temperature varying from 39° to 40° C. Then little by little the phenomena subside and the patient improves. The pyleonephritides of pregnancy are not usually serious from the standpoint of the mother, but they are for the child, who frequently dies.

The pyleonephritides of pregnancy are certainly of frequent occurrence. Gestation favors renal infection by the resulting retention due to compression by the fetus and these infections take place by way of the blood (colibacillosis), by microbic ascension coming from a bladder in a state of retention, or by the lymphatic system. A female having a pyleonephritis of pregnancy will be exposed to recurrences with each future pregnancy and Albarran has recorded several instances where women, who were cured of a pyleonephritis after their first labor, had all their symptoms reappear in pregnancies following.

Such an affection leaves its traces behind. The dilated renal pelvis offers an excellent hunting ground for future infections; a mild ordinary infection occurring after labor, retention of urine, compression of the ureters, which is to be greatly feared in such cases, represent the various factors of recurrences.

Pregnancy merely reawakens infections which have disappeared and aggravates those which exist. Occasionally nephrostomy has been performed from necessity between the second and fourth month of pregnancy in cases of pyleonephritides which have given no serious symptoms up to that time. Premature labor has been advocated as a cure for the pyelonephritides of pregnancy, but now that much experience in this matter has been obtained, it would seem that this interference is of doubtful value: The mere fact of emptying the uterus does not always cure a pyleonephritis and several cases are on record where a nephrostomy had to be resorted to several weeks or months after labor, or even several years later. On the other hand, a pyleonephritis, if it does not exist beforehand, may arise after labor and consequently, there is little use in having recourse to premature labor which, in itself, can produce the renal complications that one desires to combat.

The treatment of the latent forms of pyleonephritis of pregnancy is simple and should consist in the administration of urotropin and large quantities of liquid taken on an empty stomach. If an improvement does not manifest itself, one may resort to ureteral catheterism, followed by an irrigation of the renal pelvis with a 1:1000 or a 1:2000 solution of silver nitrate. The lavage should be continued until the fluid returns perfectly clear. Cases may be cured after a single irrigation according to Albarran.

Catheterism of the ureters can be performed up to the sixth or seventh month of pregnancy, but, after this time one can hardly consider this interference, but there are other very simple means which may be resorted to, the first being the position given to the patient. She should be kept lying down, with the pelvis raised, and reclining on the left side, because, usually, the right ureter is the one compressed by the gravid uterus. Then, Pasteau's treatment may be resorted to, viz.—lavage and distension of the bladder. This distension is supposed by its author to produce a reno-ureteral reflex, which produces contractions of the ureter and renal pelvis, so that the kidney rids itself of its pus.

If these various treatments fail, neither induced abortion or premature labor are to be advised. In the first place, as has already been said, this interference does not bring about a cure, and then again, the children are born weakly, and usually die. What should be done, if the temperature remains high, is to perform nephrostomy, but before having recourse to this interference, it is well to wait because nothing presses. It is true that this operation is not serious and assures success, on the condition that the opening into the kidney is not allowed to close and that a large drainage tube is kept in the organ until the end of pregnancy. Albarran relates several examples taken from different sources, where the renal infection recurred on account of the renal opening closing too soon. The fistula should only be allowed to close after labor, and, if this is done, both mother and child can be saved. It is, however, to be pointed out that this interference is not of ordinary occurrence, as only a few cases have been recorded.

If the pyleonephritis is bilateral, bilateral nephrostomy may be performed in one or two sittings. As to nephrectomy, it is a bad operation because a woman has not too much with both her kidneys in order to eliminate all the extractive matters of pregnancy. Nephrectomy could only possibly be considered in cases of multiple cortical abscesses, a pathologic condition which has not as yet been met with.